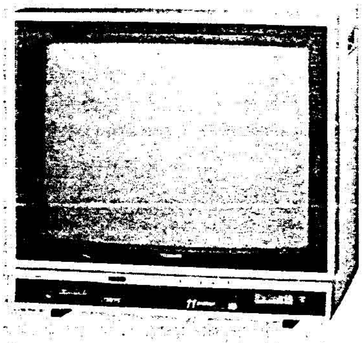
SERVICE DATA
FILE NO. 020-762
11 SYSTEM

TOSHIBA

COLOUR TELEVISION

289X4M



SPECIFICATIONS

POWER INPUT RATING	170 watts (nominal), AC90 ~ 270 volts, 50/60Hz
AERIAL INPUT IMPEDANCE	75 ohm unbalanced type VHF and UHF
RECEIVING CHANNELS	**PAL B/G, SECAM B/G system** Any of VHF channels . . . . channels 2 to 12 Any of UHF channels . . . . channels 21 to 69 **PAL D/K, SECAM D/K system** Any of VHF channels . . . . channels 1 to 12 Any of UHF channels . . . . channels 21 to 69 **PAL I system** Any of UHF channels . . . . channels 21 to 69 **NTSC standard (US M, JAPAN M) system** Any of VHF channels . . . . channels 2 to 13/1 to 12 Any of UHF channels . . . . channels 14 to 78/13 to 62 **NTSC 3.58/5.5 System**, **NTSC 4.43/5.5 System** – VTR Play Back **PAL 50/60Hz System**, **SECAM 50/60Hz System**, **NTSC 50/60Hz System** – VIDEO DISK Play Back
INTERMEDIATE FREQUENCIES	Picture I-F carrier frequency . . . . 38.9MHz Sound I-F carrier frequency 33.4MHz
CHASSIS CONSTRUCTION	IC Solid State, Horizontal Chassis
PICTURE TUBE	A66JLH70X(W) (66 cm measured on diagonal of viewable picture area) 110° Deflection
SOUND OUTPUT	4.3W + 4.3W (at 10% harmonic distortion), Max. 5W + 5W
SPEAKER	Flat: 5 cm x 12 cm (2 pcs.)
CABINET	Table type, Wooden Cabinet with Plastic Mask.
DIMENSION	Height . . . . 60.4 cm Width . . . . 64.7 cm Depth . . . . 51.8 cm
WEIGHT (NET)	52 kg
FEATURES	Full and Square tube, VIDEO and AUDIO input/output terminals, External speaker terminal, Multi Spacial Sound System, Remote Control.

Dec. 1984 Printed in Japan (SO)

SAFETY INSTRUCTIONS

WARNING: BEFORE SERVICING THIS CHASSIS, READ THE "X-RAY RADIATION PRECAUTION," "SAFETY PRECAUTION" AND "PRODUCT SAFETY NOTICE" DESCRIBED BELOW.

X-RAY RADIATION PRECAUTION

1. Excessive high voltage can produce potentially hazardous X-RAY RADIATION. To avoid such hazards, the high voltage must not be above the specified limit. The nominal value of the high voltage of this receiver is 30kv at zero beam current (minimum brightness) under 90 ~ 270V AC power source. The high voltage must not, under any circumstances, exceed 32kv. Each time a receiver requires servicing, the high voltage should be checked following the HIGH VOLTAGE CHECK procedure in this manual. It is recommended the reading of the high voltage be recorded as a part of the service record. It is important to use an accurate and reliable high voltage meter.
2. The only source of X-RAY RADIATION in this TV receiver is the picture tube. For continued X-RAY RADIATION protection, the replacement tube must be exactly the same type tube as specified in the parts list.
3. Some parts in this receiver have special safety-related characteristics for X-RAY RADIATION protection. For continued safety, parts replacement should be undertaken only after referring to the PRODUCT SAFETY NOTICE below.

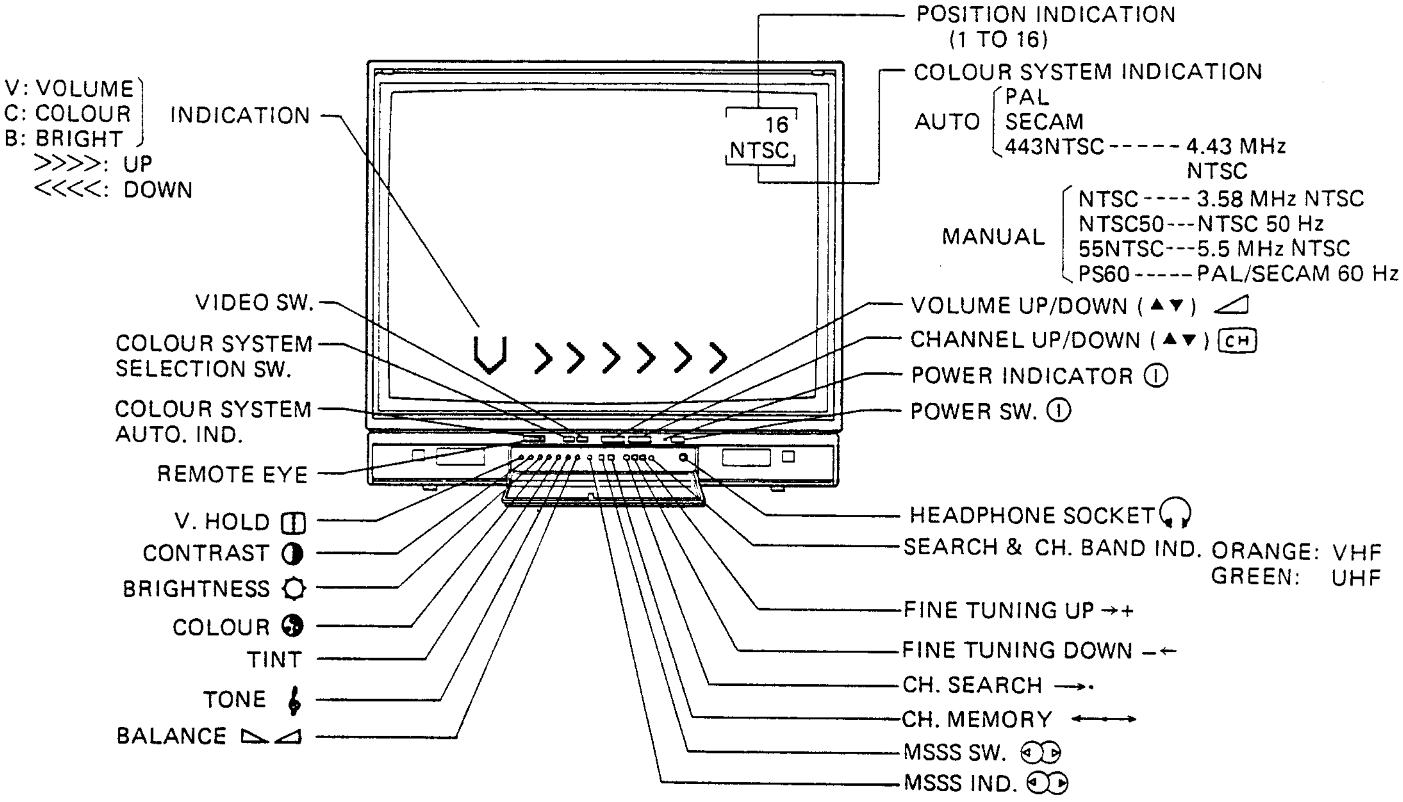
SAFETY PRECAUTION

1. Potentials as high as 28,000 volts are present when this receiver is operating. Operation of the receiver outside the cabinet or with back board removed involves a shock hazard from the receiver.
    1 Servicing should not be attempted by anyone who is not thoroughly familiar with the precautions necessary when working on high-voltage equipment.
    2 Alway discharge the picture tube anode to the receiver chassis to keep off the shock hazard before removing the anode cap.
    3 Perfectly discharge the high potential of the picture tube before handling the tube. The picture tube is highly evacuated and if broken, glass fragments will be violently expelled.
2. If any Fuse in this TV receiver is blown, replace it with the FUSE specified in the chassis parts list.
3. When replacing parts or circuit boards, wind the lead wires around terminals before soldering.
4. When replacing a high wattage resistor (oxide metal film resistor) in circuit board, keep the resistor 10mm away from circuit board.
5. Keep wires away from high voltage or high temperature components.
6. This receiver can be operated under AC 90 ~ 270 volts, 50/60Hz. NEVER connect to DC supply or any other power or frequency.

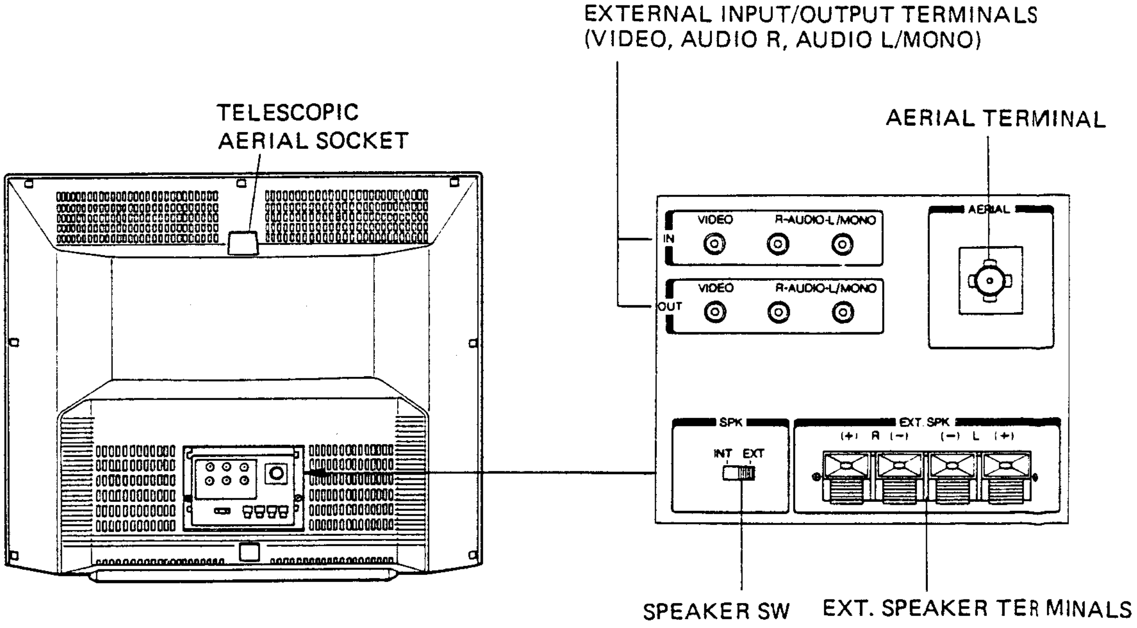
PRODUCT SAFETY NOTICE

Many electrical and mechanical parts in this chassis have special safety-related characteristics. These characteristics are often passed unnoticed by a visual inspection and the X-RAY RADIATION protection afforded by them cannot necessarily be obtained by using replacement components rated for higher voltage, wattage, etc. Replacement parts which have these special safety characteristics are identified in this manual and its supplements, electrical components having such features are identified by shading on the schematic diagram and the parts list.
Before replacing any of these components, read the parts list in this manual carefully. The use of substitute replacement parts which do not have the same safety characteristics as specified in the parts list may create X-RAY RADIATION.

FRONT CONTROLS AND REAR VIEWS


POSITION INDICATION
(1 TO 16)
COLOUR SYSTEM INDICATION
AUTO
PAL
SECAM
443NTSC ----- 4.43 MHz NTSC
MANUAL
NTSC ---- 3.58 MHz NTSC
NTSC50 --- NTSC 50 Hz
55NTSC --- 5.5 MHz NTSC
PS60 ----- PAL/SECAM 60 Hz
16
NTSC
V: VOLUME
C: COLOUR
B: BRIGHT
INDICATION
>>>>: UP
<<<<: DOWN
V >>>>>>
VIDEO SW.
COLOUR SYSTEM SELECTION SW.
COLOUR SYSTEM AUTO. IND.
REMOTE EYE
V. HOLD
CONTRAST
BRIGHTNESS
COLOUR
TINT
TONE
BALANCE
VOLUME UP/DOWN (▲▼)
CHANNEL UP/DOWN (▲▼) CH
POWER INDICATOR
POWER SW.
HEADPHONE SOCKET
SEARCH & CH. BAND IND. ORANGE: VHF GREEN: UHF
FINE TUNING UP →+
FINE TUNING DOWN −←
CH. SEARCH →·
CH. MEMORY ←→
MSSS SW.
MSSS IND.

FRONT VIEW


EXTERNAL INPUT/OUTPUT TERMINALS
(VIDEO, AUDIO R, AUDIO L/MONO)
TELESCOPIC AERIAL SOCKET
AERIAL TERMINAL
IN
OUT
VIDEO
R-AUDIO-L/MONO
AERIAL
SPK
INT EXT
EXT. SPK
(+) R (−) (−) L (+)
SPEAKER SW
EXT. SPEAKER TERMINALS

REAR VIEW

CONTROL ADJUSTMENTS

TO SWITCH ON THE TV SET

1. Push in the POWER switch. POWER indicator lights up and the receiver is ready to operate.
   Note: If you are leaving the house for a long period of time, turn off the power switch.
2. Push CH ▲▼ (channel UP/DOWN) button to turn the set on. (You can also operate the receiver with remote control hand unit by following the steps on page 5.)
   The set will turn on and a picture will appear after a few seconds. (To switch off the set, push the power button again.)

TO ADJUST VOLUME

Keep on pressing the VOLUME UP button for increase in volume. (V > - - → > on the TV. screen)
Keep on pressing the VOLUME DOWN button for decrease in volume. (V <← - - < on the TV screen)
Release the button at your desired volume level.

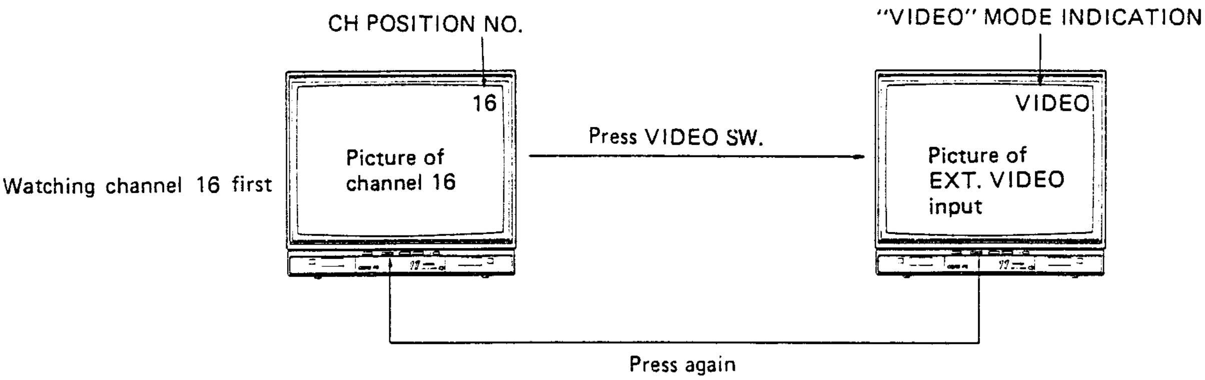
CHANNEL SELECTION AND TUNING

You can select your favourit program by the channel selection keys on the remote control hand unit or "CHANNEL UP/ DOWN" keys on the front of the receiver.
To enjoy the program which is not preset, set the channel by following procedure.

1. Channel preset procedure
   (1) Select the position to be preset
   by position Button (▲ or ▼) on T.V. set or remote control hand unit or by Direct Position Selector on remote control hand unit.
   To select 11th position or higher, push "1–" Button at first and then "1" Button or "2" to "6" next.
   11th position: "1–" and "1"
   12th position: "1–" and "2"
   13th position: "1–" and "3"
   14th position: "1–" and "4"
   15th position: "1–" and "5"
   16th position: "1–" and "6"
   (2) Search the program
   by "Search" Button.
   Search starts from the channel already preset toward the highest channel in UHF band.
   Search Indication L.E.D. will be flashing during search in orange at VHF or in green at UHF.
   When television signal is caught, flashing of L.E.D. stops and keeps to light.
   Note: Search returns to the lowest channel in VHF band and stops.
   Then longer interval flashing of L.E.D. indicates the end of "search."
   If necessary, push "Search" Button again to find another television signal.
   (3) Store the channel
   Store the channel in Memory I.C. by "Memory" Button if the desired program comes out.
   If not, repeat procedure (2).
   When storing is finished, Search Indicator goes out.
   (4) Repeat procedure above from (1) to (3) at another position as well.

TV/VIDEO

When you enjoy the program from the video equipment, such as VTR, press this button on and "VIDEO" indication comes out as illustrated below. The TV picture changes as shown in the following figures.

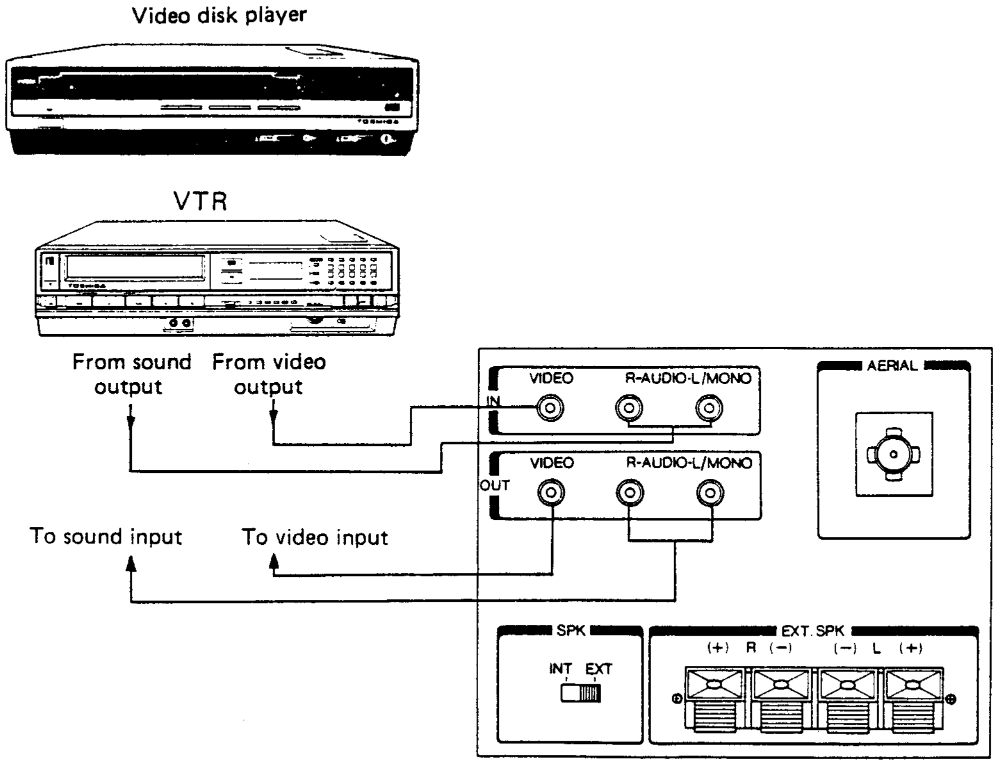

CH POSITION NO.
"VIDEO" MODE INDICATION
16
Watching channel 16 first
Picture of channel 16
Press VIDEO SW.
VIDEO
Picture of EXT. VIDEO input
Press again

NOTE: The "VIDEO" mode indication may happen to appear on the screen during playback of a VCR or a video disk player (especially at still or fast forward mode) while the indication is set to the "OFF·SCREEN" mode. This is not the trouble of the receiver.

INPUT AND OUTPUT TERMINALS

VIDEO AND AUDIO INPUT/OUTPUT TERMINALS

- This TV is provided with a video and audio input/output terminals, by which you can connect the TV to the video and audio equipment (VTR and video disk player, etc.).

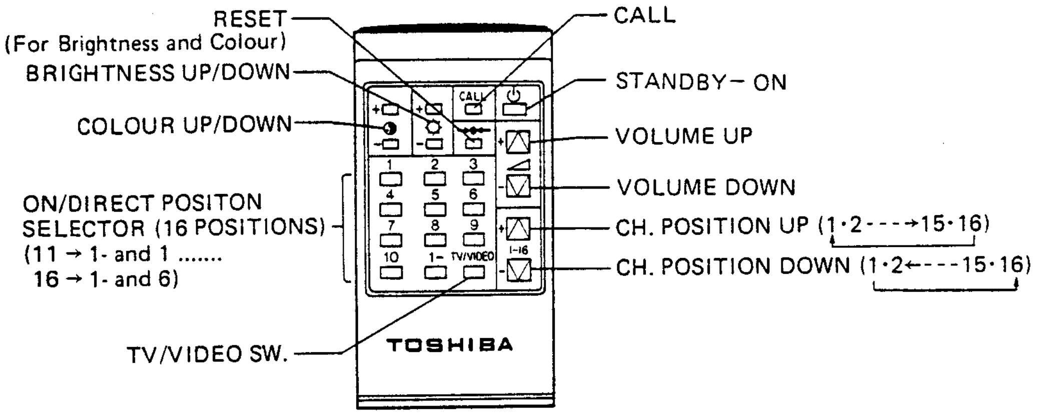

Video disk player
VTR
From sound output
From video output
To sound input
To video input
VIDEO
R-AUDIO-L/MONO
IN
VIDEO
R-AUDIO-L/MONO
OUT
AERIAL
SPK
INT EXT
EXT. SPK
(+) R (−)
(−) L (+)

Note: • When using monaural sound equipment, connect its cord to the Left/Mono jack. Identical sound will be heard from both left and right speakers.

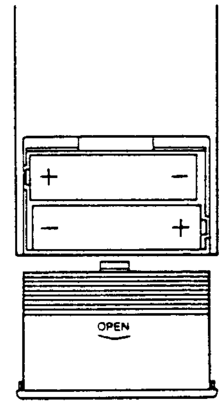
REMOTE CONTROL OPERATION

INSTALLING THE BATTERIES

1. Remove the battery cover (See figure right).
2. Install 2"AA"(penlight size) 1.5 volt batteries so the "+" and "–" marks on the batteries match the "+" and "–" marks inside the unit.
3. Install the battery cover.


RESET
(For Brightness and Colour)
BRIGHTNESS UP/DOWN
COLOUR UP/DOWN
ON/DIRECT POSITON SELECTOR (16 POSITIONS)
(11 → 1- and 1 ....
16 → 1- and 6)
TV/VIDEO SW.
CALL
STANDBY– ON
VOLUME UP
VOLUME DOWN
CH. POSITION UP (1·2---→15·16)
CH. POSITION DOWN (1·2←---15·16)
CALL
1 2 3 4 5 6 7 8 9 10 1- TV/VIDEO I-16
TOSHIBA

FRONT VIEW



REAR VIEW

REMOTE OPERATION

Before using the Remote Hand Unit, push the power switch on the receiver to turn the TV set to standby mode.

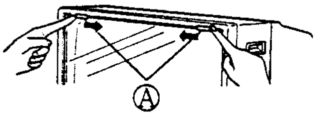
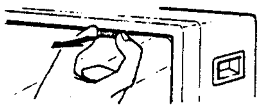
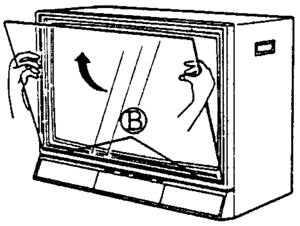
1. STANDBY "ON/OFF" BUTTON
   To switch on, push the button. To switch off, push the button again.
2. ON/DIRECT POSITION SELECTOR
   To switch the TV set "ON", press any of the postion buttons, and the program in that position comes out.
3. VOLUME UP or DOWN Button.
   Continuous press increases Volume gradually. (V >---→>) are displayed on the TV screen.
   Continuous press decreases Volume gradually. (V <---→<) are displayed on the TV screen.
   Release the button at your desired volume.
4. BRIGHTNESS UP or DOWN Button
   Continuous press increases Brightness gradually. (B >---→>) are displayed on the TV screen.
   Continuous press decreases Brightness gradually, (B <---→<) are displayed on the TV screen.
5. COLOUR UP or DOWN Button
   Continuous press increases Colour gradually. (C >---→>) are displayed on the TV screen.
   Continuous press decreases Colour gradually. (C <---→<) are displayed on the TV screen.
6. CALL Button
   The selected CH. No. and the colour system are indicated on the TV screen when the "CALL"button is pressed. The indication disappears by the second press.
7. RESET
   By pushing the RESET button, the levels of the colour and the brightness return to the medium levels.
8. TV/VIDEO Button
   The function is exactly the same as "TV/VIDEO SWITCH".

TIPS FOR REMOTE OPERATION

- If intermittent operation occurs, replace the batteries according to "INSTALLING THE BATTERIES."
  The battery life should be about a year under normal use.
- When the Remote Hand Unit is not used for a long period of time or when the batteries are worn out, take out the batteries to prevent liquid leakage.
- To prevent malfunction, depress only one button at a time.

GLASS FILTER

This TV is equipped with a glass filter to conduce to comfortable viewing preventing external diffused reflection.
Dust may accumulate between picture tube and glass filter over a long period. In this case, clean the picture tube and glass filter after removing the glass filter as outlined below.

	Slide the holders (A) (on both top sides) in the arrow direction until they click.
	Remove the holders by pulling them toward you, holding the glass with one hand.
	Remove the glass carefully from the guide (B) by slanting it toward you.

- When mounting the glass, follow the reverse steps of removal.
- Be careful handling the glass filter so as not to scratch or break it.
- Use a soft cloth to clean the glass and picture tube.

WARNING: BEFORE SERVICING THIS CHASSIS, READ THE "X-RAY RADIATION PRECAUTION," "SAFETY PRECAUTION" AND "PRODUCT SAFETY NOTICE" ON PAGE 1 OF THIS MANUAL.

INSTALLATION AND SERVICE ADJUSTMENTS

GENERAL INFORMATIONS

All adjustments are thoroughly checked and corrected when the receiver leaves the factory. Therefore the receiver should operate normally and produce proper colour and B/W pictures upon installation. However, several minor adjustments may be required depending on the particular location in which the receiver is operated.

This receiver is shipped completely in cardboard carton. Carefully draw out the receiver from the carton and remove all packing materials.

Plug the power cord into a convenient 90 ~ 270 volts 50/60Hz AC two pin power outlet. Turn the receiver ON.

Check and adjust all the customer controls such as BRIGHTNESS, CONTRAST and COLOUR Controls to obtain natural colour or B/W picture.

AUTOMATIC DEGAUSSING

A degaussing coil is mounted around the picture tube so that external degaussing after moving the receiver is normally unnecessary, providing the receiver is properly degaussed upon installation. The degaussing coil operates for about 1 second after the power to the receiver is switched ON. If the set is moved or faced in a different direction, the power switch must be switched off at least 10 minutes in order that the automatic degaussing circuit operates properly.

Should the chassis or parts of the cabinet become magnetized to cause poor colour purity, use an external degaussing coil. Slowly move the degaussing coil around the faceplate of the picture tube, the sides and front of the receiver and slowly withdraw the coil to a distance of about 2 m before disconnecting it from AC source. If colour shading still persists, perform the COLOUR PURITY ADJUSTMENT and CONVERGENCE ADJUSTMENTS procedures, as mentioned later.

RECTIFIER VOLTAGE ADJUSTMENT (R850)

1. Connect the AC plug of TV to the AC power line through the AC voltage adjuster.
   Note: Check AC line waveform for the low distortion.
2. Tune in an active channel. Adjust the BRIGHTNESS and CONTRAST controls for normal picture.
3. Set the AC input voltage for TV to 140V (rms).
4. Connect the voltmeter (DC range) to the plus lead of C810.
5. Adjust R850 until the voltage reading on the meter turns from the low voltage (185V approx.) to 350V approx.

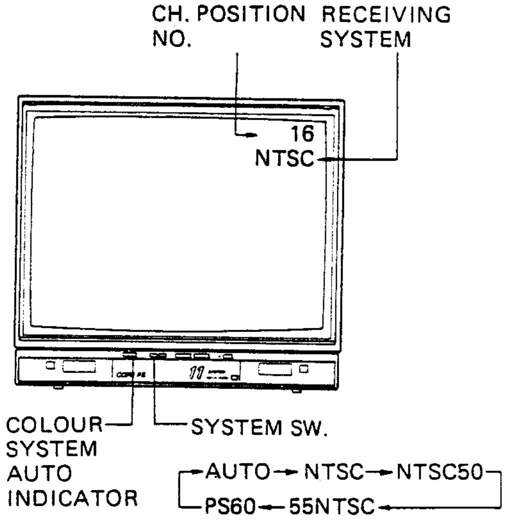
HIGH VOLTAGE CHECK

CAUTION: There is no HIGH VOLTAGE ADJUSTMENT on this chassis.

1. Connect an accurate high voltage meter to the second anode of the picture tube.
2. Turn on the receiver. Set the BRIGHTNESS and CONTRAST Controls to minimum (zero beam current).
3. High voltage will be measured below 32kV
4. Rotate the BRIGHTNESS Control to both extremes to be sure the high voltage does not exceed the limit of 32kV under any conditions.

SYSTEM SWITCH OPERATION

This TV receiver can receive 11 systems.



- AUTO .... Signal of PAL B/G, SECAM B/G, PAL D/K, SECAM D/K, PAL I and 4.43 NTSC can be received.
  (System Auto Indicator lamp is lighting. Display of system name is one of PAL, SECAM or 4.43 NTSC.)
  Note: System Auto indicator does not light when receiving B/W program at this mode.
- NTSC .... 3.58 NTSC signal can be received. U.S.CHANNEL, JAPAN CHANNEL (PHILIPPINES, KOREA)
- NTSC50 ...... Signal of NTSC 50Hz from VIDEO DISK can be received.
- 55NTSC ...... Signal of 3.58/5.5M NTSC from VTR can be received.
- PS60 .... Signal of PAL 60Hz or SECAM 60Hz from VIDEO DISK can be received.

HORIZONTAL OSCILLATOR ADJUSTMENT

If there is an indication of unstable horizontal sync., adjust the HORIZONTAL HOLD Control (R451) to remove the condition. Adjust the HORIZONTAL HOLD to the centre of the pull-in range.

VERTICAL OSCILLATOR ADJUSTMENT

If the picture moves up or down on the screen, adjust the VERTICAL HOLD Control (R351) until there is a single image without vertical movement.

HEIGHT ADJUSTMENT

HEIGHT Control (R352) on MAIN Board changes the size of the picture or pattern, having an equal effect on the top and bottom. Make final adjustment to overscan the mask 2 cm at top and bottom.

FOCUS ADJUSTMENT

Adjust FOCUS Control on FLYBACK TRANS. (T461) for well defined scanning lines in the centre area on the screen.

DELAYED R-F AGC ADJUSTMENT

1. Tune the set in the strongest station in your area.
2. Turn AGC DELAY Control (R151) on MAIN Board to fully counterclockwise position.
3. Adjust AGC DELAY Control clockwise until noise (snow) disappears on the screen.

AFC (Automatic Frequency Control) FIELD ALIGNMENT

1. Tune the set to an active channel and adjust fine tuning for best picture with MFT UP, DOWN buttons.
2. To activate AFC, temporarily tune in the next active channel with SEARCH button and return to the previous channel.
3. Adjust L152 for the best tuned picture.
4. Detune to higher or lower side with MFT button. Then temporarily change to the next active channel with SEARCH button, and return to the previous channel to check for the best tuned picture.

BELL COIL (LM51) ADJUSTMENT

1. Receive SECAM colour bar signal.
2. Connect the synchroscope to the terminal TPM-01.
3. Adjust LM51 for the flat level of amplitude in each colour bar waveform on the scope. (See figure 1.)

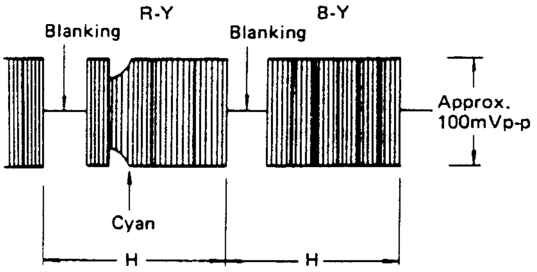


Figure 1.

IDENT COIL (LM52) ADJUSTMENT

1. Receive SECAM colour bar signal.
2. Connect the DC voltmeter (Digital Voltmeter) to the pin 26 of ICM01.
3. Adjust LM52 for the maximum indication (approx. DC10V) on the meter.

B-Y, R-Y DEMOD COIL (LM53, LM54) ADJUSTMENT

1. Receive SECAM colour bar signal.
2. Connect the synchroscope to the pin 22 of ICM01.
3. Adjust LM53 so that the white level in picture part reaches to the vertical retrace line. (See figure 2.)
4. Then change the connection of synchroscope from the pin 22 to the pin 18 of ICM01.
5. Adjust LM54 so that the white level in picture part reaches to the vertical retrace line. (See figure 3.)

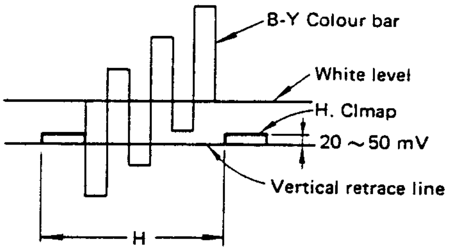


Figure 2.

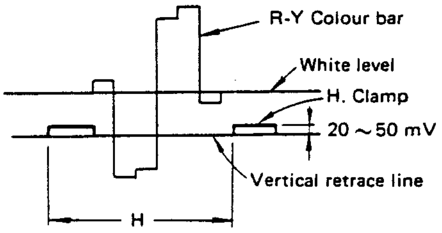


Figure 3.

COLOUR SYNC. ADJUSTMENT (C551: 4.43MHz PAL, CN51: 3.58MHz NTSC)

FOR 4.43MHz PAL

1. Receiver a PAL colour bar signal.
2. Connect terminal TP-43 to the earth of IC501 with the short jumper wire.
3. Connect pin 12 of IC501 to pin 2 of IC501 with a 10k ohm resistor so that the colour killer turns off.
4. Then the colour stripes appear on the screen when the adjustment is incorrect. Adjust the variable capacitor (C551) so that the colour bar pattern stands still or drifts slowly across the picture screen.
5. Remove the 10k ohm resistor.

FOR 3.58MHz NTSC

1. Receive a NTSC 3.58MHz colour bar signal.
2. Connect terminal TP-43 to the earth of IC501 with the short jumper wire.
3. Connect pin 12 of IC501 to pin 2 of IC501 with a 10k ohm resistor so that the colour killer turns off.
4. Observing the screen, adjust the variable capacitor (CN51) so that the colour bar pattern stands still.
5. Remove the 10k ohm resistor.

PAL MATRIX ADJUSTMENT

1. Tune in the colour programme including the colour bar signals.
2. Set the COLOUR Control VR. to obtain the proper colour.
3. If the PAL MATRIX adjustment is in correct, the Venetian Blind would appear in the colour bars area. This case needs the adjustment.
4. At the first, adjust DL PHASE ADJ. Coil (L551) to minimize the Venetian Blind.
5. Next, connect the terminal TP-43 to the earth with a capacitor (30 pF ~ 50 pF). If the Venetian Blind appears, adjust 1H-DL ADJ. VR. (R551) to minimize the Blind.
6. Remove the capacitor, and if the Venetian Blind still remains, adjust 1H-DL PHASE ADJ. Coil (L551) to minimize the Blind again.
7. Adjust the BURST PHASE Coil (L552) for the maximum of output response at the base of Q509.
8. Repeat the item 5 and 6 procedures, adjust the R551 and L551 until the Blind does not appear when the capacitor is connected.
9. Adjust the BURST PHASE Coil (L552) for the maximum of output response at the base of Q509.

SIF DET. ADJUSTMENT
L651 FOR 6.0MHz

1. Set the system switch (S201) to the PAL/SECAM position.
2. Apply +5V DC from an external supply through a resistor 2k ohm to deactivate PIF circuit.
3. Connect the 6.0MHz signal (Modulation: 400Hz/15kHz deviation, 100dBμ) of SIF S.G. to R109 through a capacitor 0.01μF.
4. Connect the millivoltmeter to pin 23 of IC101.
5. Adjust L651 for the maximum reading on the meter.

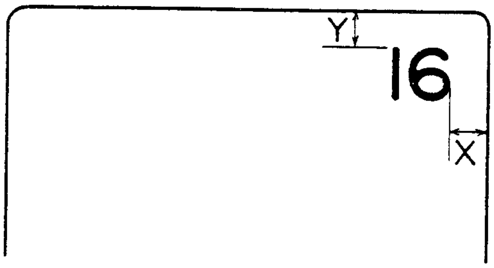
CN52 FOR 4.5MHz

1. Set the system switch (S201) to the 3.58 NTSC position.
2. Apply +5V DC from an external supply through a resistor 2k ohm to deactivate PIF circuit.
3. Connect the 4.5MHz signal (Modulation: 400Hz/7.5kHz deviation, 100dBμ) of SIF S.G. to R109 through a capacitor 0.01μF.
4. Connect the millivoltmeter to pin 23 of IC101.
5. Adjust the variable capacitor (CN52) for the maximum reading on the meter.

CHARACTER DISPLAY ADJUSTMENT (CB04)

- **5MHz Oscillator**

1. Tune in an active channel.
2. Short both leads of RB06 with a short jumper.
3. Connect frequency counter to pin 11 of ICB01.
4. Adjust CB04 for 5MHz reading on the counter.
5. Remove the short jumper.
6. After the above adjustment, check the character display for the regular position as in the figure.



X .... 52 mm
Y .... 30 mm

COLOUR PURITY ADJUSTMENT

Note: Before attempting any purity adjustments, the receiver should be operated for at least fifteen minutes. Purity adjustment requires Rubber Wedge kit.

1. Demagnetize the picture tube and cabinet using a degaussing coil.
2. Turn the CONTRAST and BRIGHTNESS Controls to maximum.
3. Adjust RED and BLUE CUT OFF controls (R557 and R559) to provide only a green raster. Advance the GREEN CUT OFF Control (R558) if necessary.
4. Loosen the clamp screw holding the yoke, and slide the yoke backward or forward to provide vertical green belt (zone) in the picture screen.
5. Remove the Rubber Wedges.

6. Rotate and spread the tabs of the purity magnet (See figure 7) around the neck of the picture tube until a green belt is obtained in the centre of the screen. And at the same time, centre the raster vertically by adjusting the magnet.
7. Move the yoke slowly forward or backward until a uniform green screen is obtained. Tighten the clamp screw.
8. Check the purity of the red and blue raster by adjusting the CUT OFF Controls.
9. Tighten the clamp screw of the yoke temporarily.
10. Obtain a white raster; referring to "CRT GREY SCALE ADJUSTMENT".
11. Proceed with convergence adjustment.

CRT GREY SCALE ADJUSTMENT

1. Tune in an active channel.
2. Set the COLOUR Control to minimum.
3. Turn the SCREEN Control (on T461) fully counterclockwise.
4. By rotating the RED, GREEN and BLUE CUT OFF Controls (R557, R558, R559) clockwise from the minimum, set them to the mid position. (90° position 14" model).
5. Set the GREEN and BLUE DRIVE Controls (R252, R253) to the mid position.
6. Disconnect the RASTER TIP.
7. Short temporarily terminals Ⓙ and Ⓗ on the MAIN Board with a jumper wire.
8. Rotate the SCREEN Control gradually clockwise until the first line appears slightly on the screen. Then turn fully counterclockwise the two CUT OFF Controls corresponding to the colours of the first and the second horizontal lines to eliminate the lines.
9. Rotate the SCREEN Control gradually clockwise until the first horizontal line of a colour (RED, GREEN or BLUE) appears slightly on the screen.
   Set the SCREEN Control to this position.
   At the base of the colour, rotate the remaining two CUT OFF Controls gradually clockwise until the horizontal lines of each colour appear slightly on the screen.
   Adjust the CUT OFF Controls to obtain the slightly lighted horizontal lines in the same levels of three colours (RED, GREEN and BLUE).
   The lines may look like white if the CUT OFF Controls are adjusted properly.
10. Remove a jumper wire between terminal Ⓙ and Ⓗ and reconnect the RASTER TIP.
11. Rotate the BRIGHTNESS and CONTRAST Controls to the maximum.
12. Adjust the BLUE and GREEN DRIVE Controls (R252/R253) to obtain proper white-balanced picture in high light areas.
13. Rotate the BRIGHTNESS and CONTRAST Controls to obtain dark grey raster. Then check the white balance in low brightness. If the white balance is not proper, retouch the CUT OFF Controls and DRIVE Controls to obtain a good white balance in both low and high light areas.

SUB-BRIGHTNESS ADJUSTMENT

1. Tune in a colour programme.
2. Set the CONTRAST Control to the maximum and the BRIGHTNESS Control to the centre.
3. Set the COLOUR Control to the centre.
4. Set the SUB-BRIGHT. Control (R255) to the centre and leave the receiver for five minutes in this state.
5. Watching the picture well, adjust the SUB-BRIGHT. Control in the position where the picture does not show evidence of blooming in high bright area and not appear too dark in low bright portion.
6. Check the proper picture variation by rotating the CONTRAST and BRIGHTNESS Controls to both extremes.
7. If the picture does not appear dark with the CONTRAST and BRIGHTNESS Controls turned to the minimum, or not appear bright with the controls turned to the maximum, adjust the SUB-BRIGHT. Control again for the acceptable picture.

CONVERGENCE ADJUSTMENTS

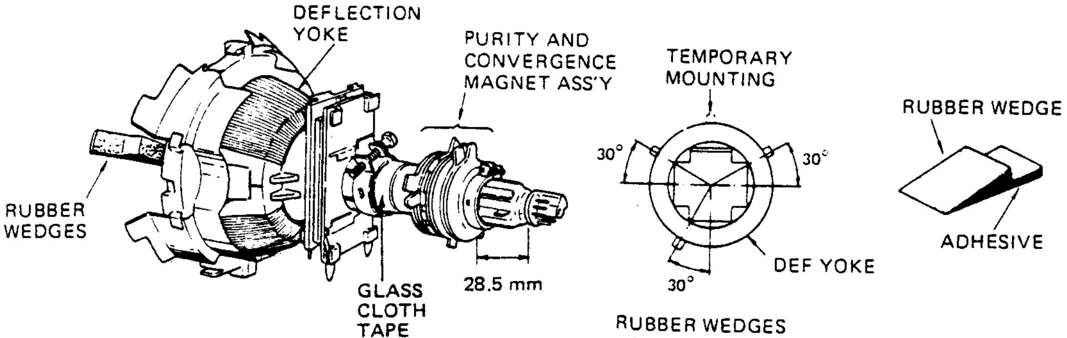
Note: Before attempting any convergence adjustments, the receiver should be operated for at least fifteen minutes.

■ **Centre Convergence Adjustment**

1. Receive crosshatch pattern with a colour bar signal generator.
2. Adjust the BRIGHTNESS and CONTRAST Controls for well defined pattern.
3. Adjust two tabs of the 4-Pole Magnets to change the angle between them (See figure 7.) and superimpose red and blue vertical lines in the centre area of the picture screen. (See figure 8.)
4. Turn the both tabs at the same time keeping the constant angle to superimpose red and blue horizontal lines at the centre of the screen. (See figure 8.)
5. Adjust two tabs of 6-Pole Magnets to superimpose red/blue line and green one. Adjusting the angle affects the vertical lines and rotating both magnets affects the horizontal lines.
6. Repeat adjustments 3, 4, 5 with understanding red, green and blue movement, because 4-Pole Magnets and 6-Pole Magnets have mutual affection and it makes dots movement complex.

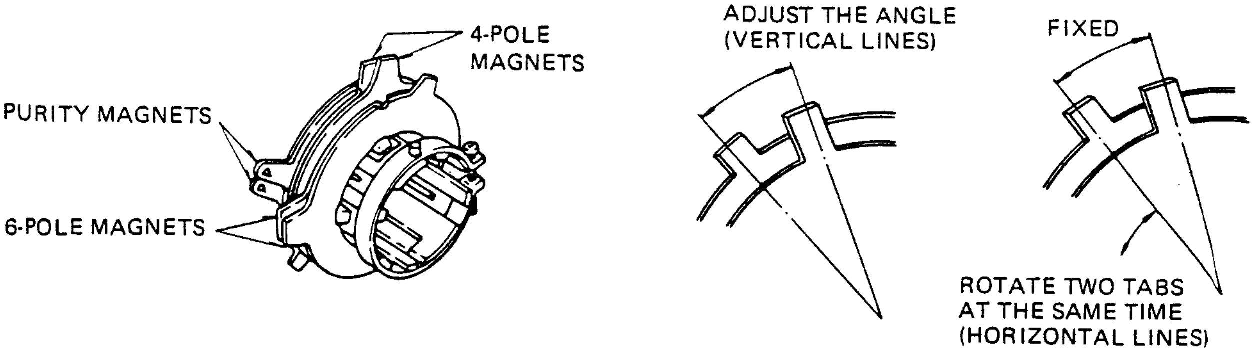
■ **Circumference Convergence Adjustment**

1. Loosen the clamping screw of deflection yoke to allow the yoke to tilt.
2. Put a wedge as shown in figure 6 temporarily. (Do not remove cover paper on adhesive part of the wedge.)
3. Tilt front of the deflection yoke up or down to obtain better convergence in circumference. (See figure 8.) Push the mounted wedge into the space between picture tube and the yoke to fix the yoke temporarily.
4. Put other wedge into bottom space and remove the cover paper to stick.
5. Tilt front of the yoke right or left to obtain better convergence in circumference. (See figure 8.)
6. Keep the yoke position and put another wedge in either upper space. Remove cover paper and stick the wedge on picture tube to fix the yoke.
7. Detach the temporarily mounted wedge and put it in another upper space. Stick it on picture tube to fix the yoke.
8. After fixing three wedges, recheck overall convergence. Tighten the screw firmly to fix the yoke and check the yoke is firm.
9. Stick 3 adhesive tapes on wedges.


DEFLECTION YOKE
PURITY AND CONVERGENCE MAGNET ASS'Y
TEMPORARY MOUNTING
RUBBER WEDGE
RUBBER WEDGES
30°
30°
30°
DEF YOKE
ADHESIVE
GLASS CLOTH TAPE
28.5 mm

RUBBER WEDGES LOCATION

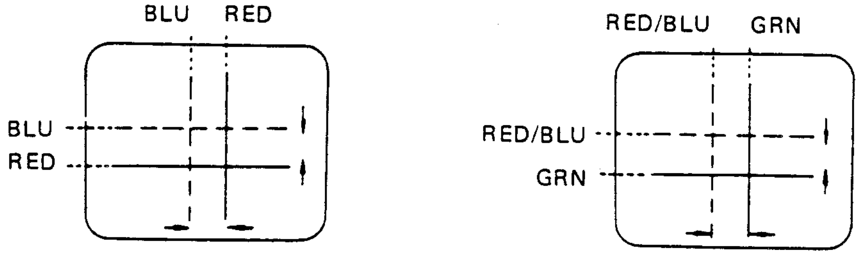
Figure 6.


4-POLE MAGNETS
PURITY MAGNETS
6-POLE MAGNETS
ADJUST THE ANGLE (VERTICAL LINES)
FIXED
ROTATE TWO TABS AT THE SAME TIME (HORIZONTAL LINES)

CONVERGENCE MAGNET ASSEMBLY

ADJUSTMENT OF MAGNETS

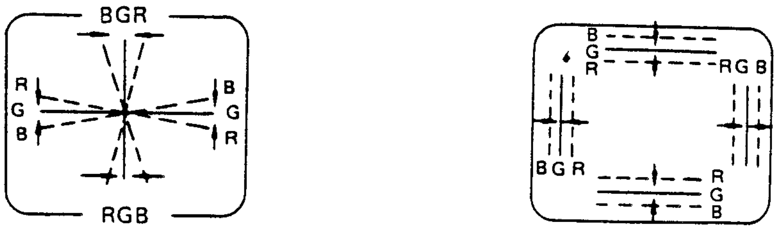
Figure 7.


BLU
RED
BLU
RED
RED/BLU
GRN
RED/BLU
GRN

4-POLE MAGNETS MOVEMENT

6-POLE MAGNETS MOVEMENT

Center Convergence by Convergence Magnets


BGR
R
G
B
B
G
R
RGB
B
G
R
RG B
BG R
R
G
B

INCLINE THE YOKE UP (OR DOWN)

INCLINE THE YOKE RIGHT (OR LEFT)

Circumference Convergence by DEF Yoke

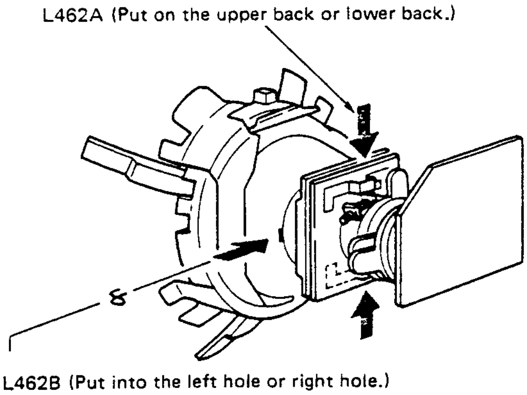
Figure 8. Dot Movement Pattern

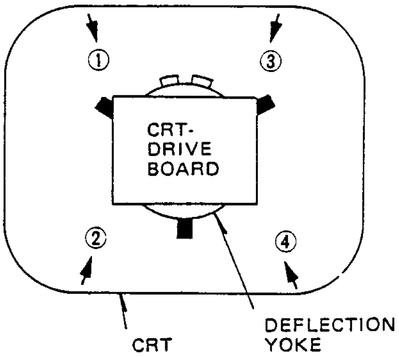
CONVERGENCE COMPENSATOR

Compensators L462A and L462B are used to correct misconvergence (Red-Gree) at the top center or bottom center on screen, when the misconvergence is still evident even though the yoke adjustment is tried.

Compensator L462C is also used to correct misconvergence (Vertical shift of Red or Blue) at four corners on screen.

1. To correct horizontal misconvergence (Red-Green), put compensator L462A on the yoke back (see figure right) to find a position for minimizing misconvergence. Mark the position and remove protective paper on the rear of L462A to stick it in place. Apply adhesives on both of yoke and L462A.
2. To correct vertical misconvergence (Red-Green), put the tips of compensator L462B into either of holes on the yoke core and apply adhesives.
3. To correct up or down shift of Red at top right or bottom right corner, put compensator L462C at the point ① or ② on the picture tube (see figure right.) to find a position for minimizing misconvergence.
   Mark the position and remove protective paper on the rear of L462C to stick it in place.
4. To correct up or down shift of Blue at top left or bottom left corner, put compensator L462C at the point ③ or ④ on the picture tube (see figure right.) to find a position for minimizing misconvergence.
   Mark the position and remove protective paper on the rear of L462C to stick it in place.


L462A (Put on the upper back or lower back.)
L462B (Put into the left hole or right hole.)



PICTURE I-F SWEEP ALIGNMENT

GENERAL	Refer to figures 9 for test equipment connection and alignment points.
PRELIMINARY STEPS	1. Disconnect the solder link (Tuner IF) on the foil side of Main Board. 2. Supply +12V DC to Main Board 3. Supply +3 volt bias to terminal "TP-14" on Main Board through 100 ohm resistor. 4. Turn AGC DELAY Control (R151) on Main Board fully clockwise.
SWEEP/MARKER GENERATOR	Connect to the solder link (R161 side of tuner IF). Tune to 25 ~ 45 MHz sweep.
OSCILLOSCOPE	Connect with direct probe to terminal "TP-12" on Main Board through 100k ohm resistor.

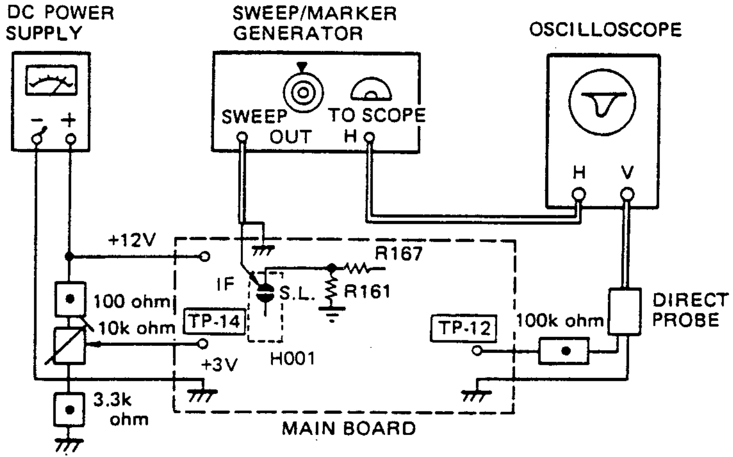

DC POWER SUPPLY
SWEEP/MARKER GENERATOR
OSCILLOSCOPE
SWEEP OUT
TO SCOPE H
H
V
+12V
R167
IF
S.L.
R161
100 ohm
10k ohm
TP-14
+3V
H001
TP-12
100k ohm
DIRECT PROBE
3.3k ohm
MAIN BOARD

Figure 9. Picture I-F Sweep Alignment

STEP	SWEEP/MARKER GENERATOR	ADJUST	REMARKS
L151 ALIGNMENT Set Oscilloscope gain for 0.5V/cm. Adjust sweep output for easy alignment. (See figure 10.)			
Detector Coil	38.9 MHz Marker "ON"	L151	Adjust L151 for maximum gain at 38.9 MHz on SCOPE. (See figure 10.)
After completing the above steps, disconnect equipment and adjust the AGC DELAY Control (R151) following DELAYED R-F AGC ADJUSTMENT on page 6.			
TN01 4.5MHz/TN02 6.0MHz TRAP ALIGNMENT Set Oscilloscope gain for 4mV/cm. Adjust sweep output for easy alignment (See figure 11.)			
4.5MHz Trap Coil 6.0MHz Trap Coil	34.4MHz Marker "ON" 32.9MHz Marker "ON"	TN01 TN02	1. Ground CN07 to make the set NTSC 3.58 system. 2. Connect collector of Q161 to oscilloscope through detector in figure 12. 3. Connect 34.4/32.9MHz Marker to oscilloscope and repeat adjustment with TN01/TN02 so that each frequency is minimum.

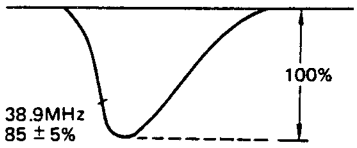


Figure 10.

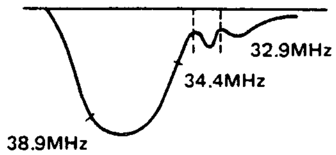


Figure 11.

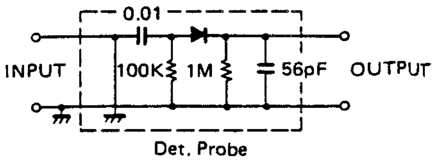

0.01
INPUT
100K
1M
56pF
OUTPUT
Det. Probe

Figure 12.

AFC ALIGNMENT

GENERAL	Refer to figures 13 for alignment points and test equipments connection.
PRELIMINARY STEPS	1. Unsolder the solder links ⓐ and ⓑ shown in the figure below. 2. Follow the same steps as given under PICTURE I-F SWEEP ALIGNMENT on page 11.
SWEEP/MARKER GENERATOR	Connect to the solder link (R161 side of tuner IF) on the foil side of Main Board. Tune to 25 ~ 45MHz sweep.
OSCILLOSCOPE	Connect direct probe, to terminal 3 of R152 on Main Board.

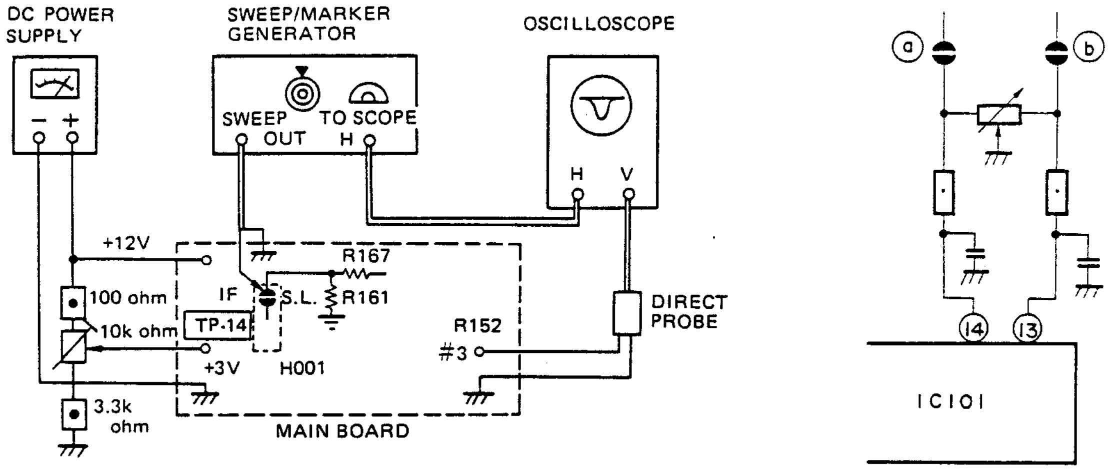

DC POWER SUPPLY
− +
SWEEP/MARKER GENERATOR
SWEEP OUT
TO SCOPE H
OSCILLOSCOPE
H V
+12V
100 ohm
10k ohm
3.3k ohm
+3V
IF
TP-14
S.L.
R167
R161
H001
R152
#3
DIRECT PROBE
MAIN BOARD
ⓐ
ⓑ
⑭
⑬
IC101

Figure 13. AFC Alignment

STEP	SWEEP/MARKER GENERATOR	ADJUST	REMARKS
1. AFC Balance	NO SIGNAL	R152	Connect the ground side of VTVM to the terminal 3 and hot side to terminal 1 of R152 on the Main Board. Adjust R152 (BALANCE ADJUST) for 0.3 volt reading on meter.
2. Primary fo	38.9MHz	L152	Remove the VTVM, Connect Direct Probe to Terminal 3 of R152 on Main Board. Adjust L152 for the response shown in figure 14.
After completing above steps, resolder the solder links and disconnect the equipments.			

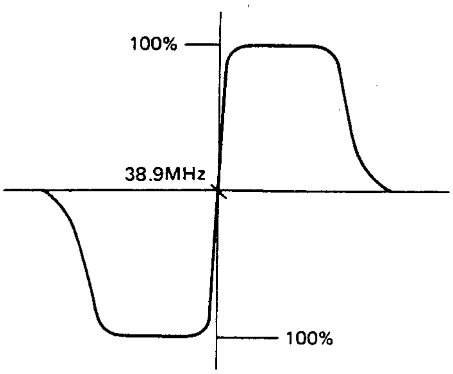


Figure 14. AFC Response

CHASSIS TOP VIEW

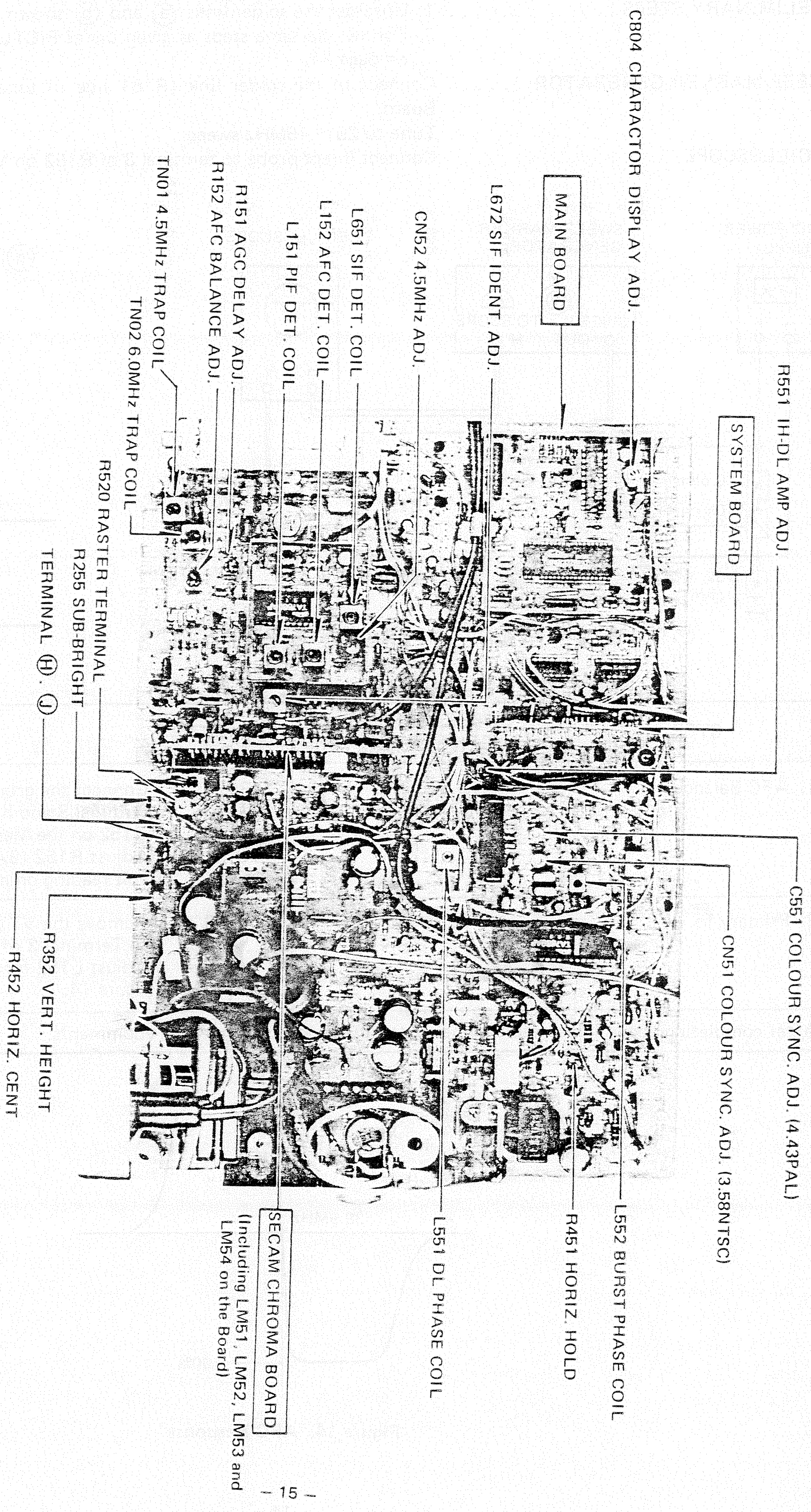

R551 1H-DL AMP ADJ.
CB04 CHARACTER DISPLAY ADJ.
SYSTEM BOARD
MAIN BOARD
L672 SIF IDENT. ADJ.
CN52 4.5MHz ADJ.
L651 SIF DET. COIL
L152 AFC DET. COIL
L151 PIF DET. COIL
R151 AGC DELAY ADJ.
R152 AFC BALANCE ADJ.
TN01 4.5MHz TRAP COIL
TN02 6.0MHz TRAP COIL
R520 RASTER TERMINAL
R255 SUB-BRIGHT
TERMINAL Ⓗ, Ⓙ
R352 VERT. HEIGHT
R452 HORIZ. CENT
C551 COLOUR SYNC. ADJ. (4.43PAL)
CN51 COLOUR SYNC. ADJ. (3.58NTSC)
L552 BURST PHASE COIL
R451 HORIZ. HOLD
L551 DL PHASE COIL
SECAM CHROMA BOARD
(Including LM51, LM52, LM53 and LM54 on the Board)

Figure 15. Chassis Top View

CHASSIS REAR VIEW

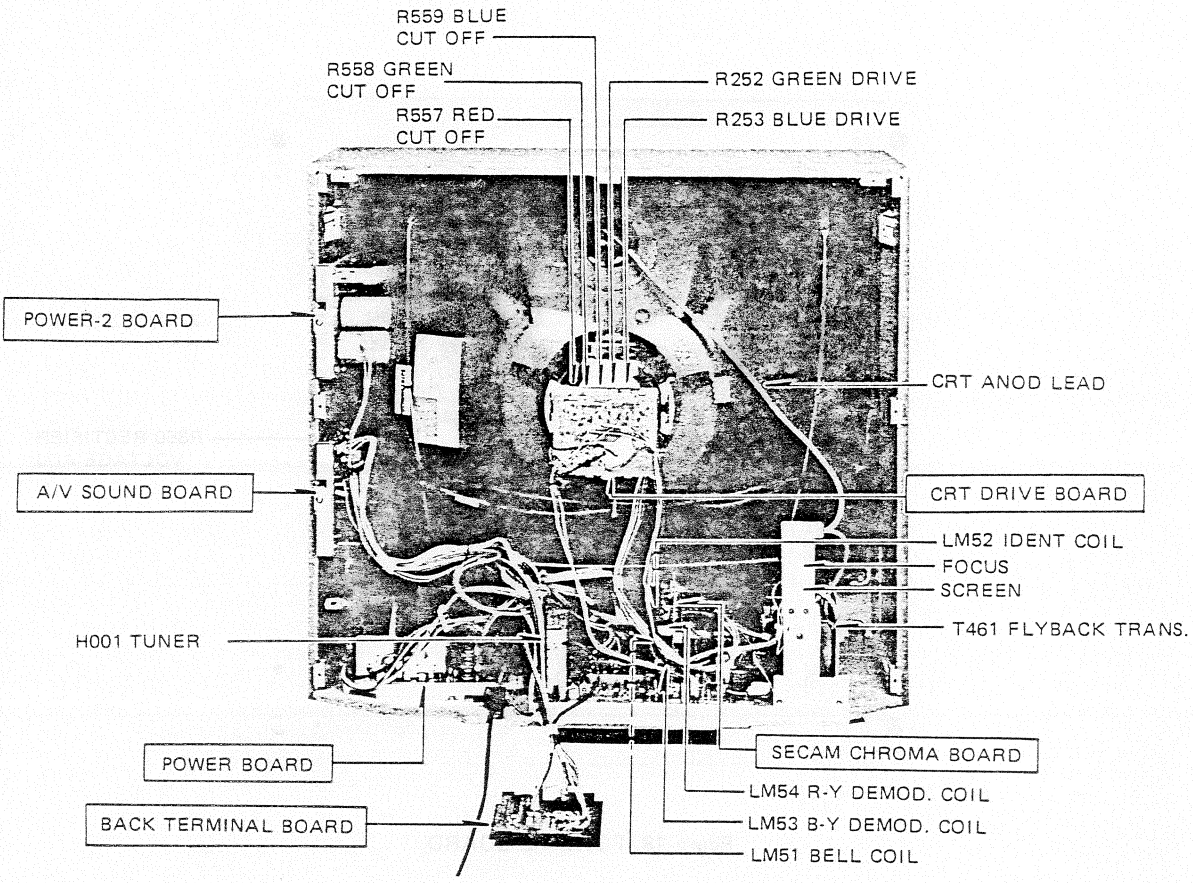

R559 BLUE
CUT OFF
R558 GREEN
CUT OFF
R557 RED
CUT OFF
R252 GREEN DRIVE
R253 BLUE DRIVE
POWER-2 BOARD
CRT ANOD LEAD
A/V SOUND BOARD
CRT DRIVE BOARD
LM52 IDENT COIL
FOCUS
SCREEN
H001 TUNER
T461 FLYBACK TRANS.
SECAM CHROMA BOARD
POWER BOARD
LM54 R-Y DEMOD. COIL
BACK TERMINAL BOARD
LM53 B-Y DEMOD. COIL
LM51 BELL COIL

Figure 16. Chassis Rear View

P.C. BOARD TOP VIEWS

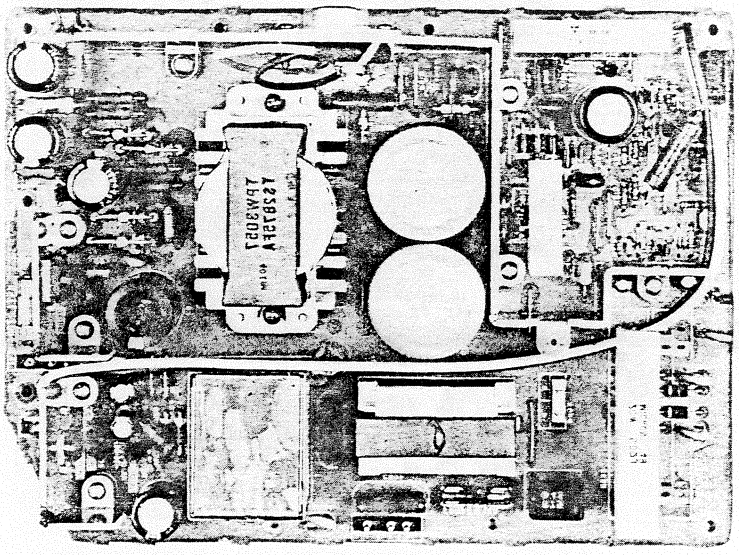


Figure 17. POWER BOARD

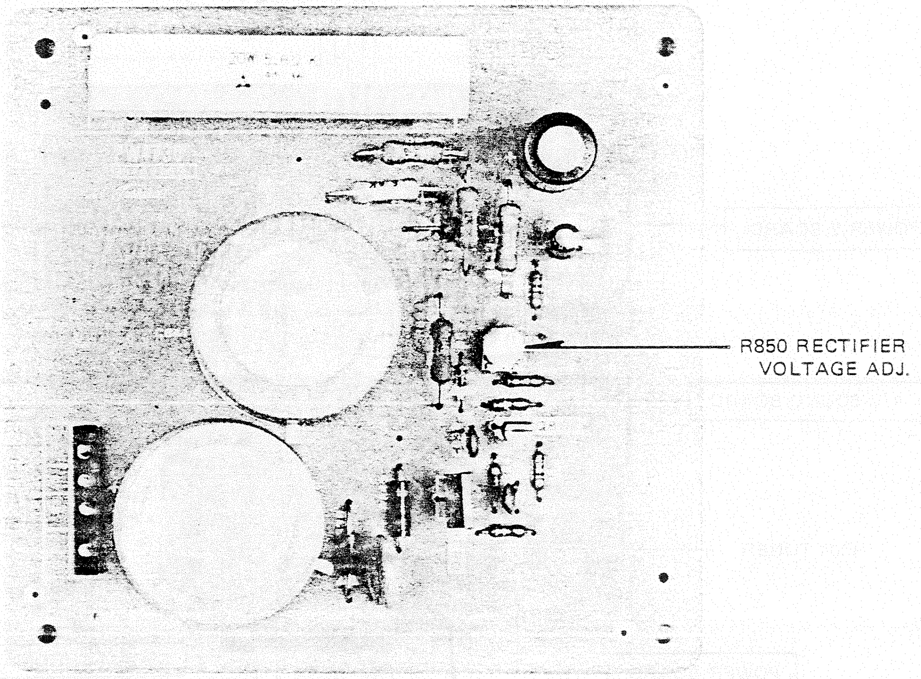

R850 RECTIFIER
VOLTAGE ADJ.

Figure 18. POWER-2 BOARD

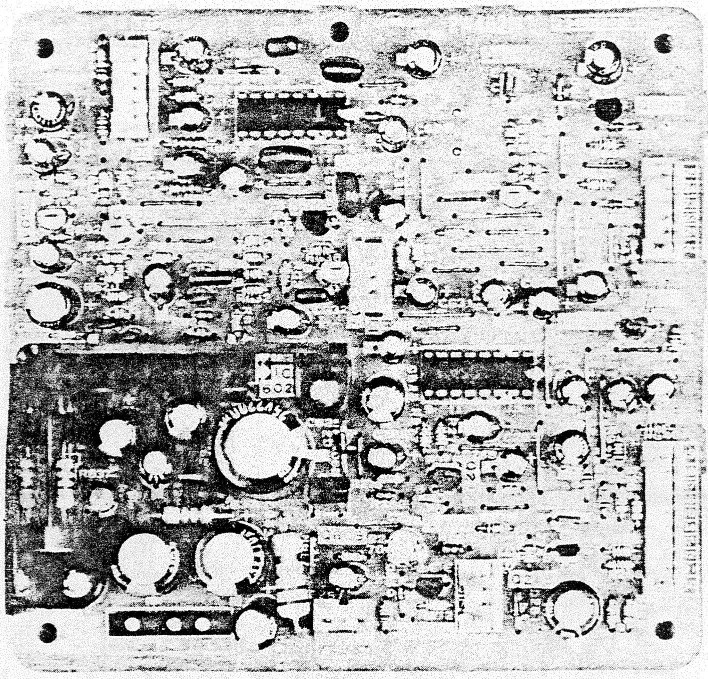
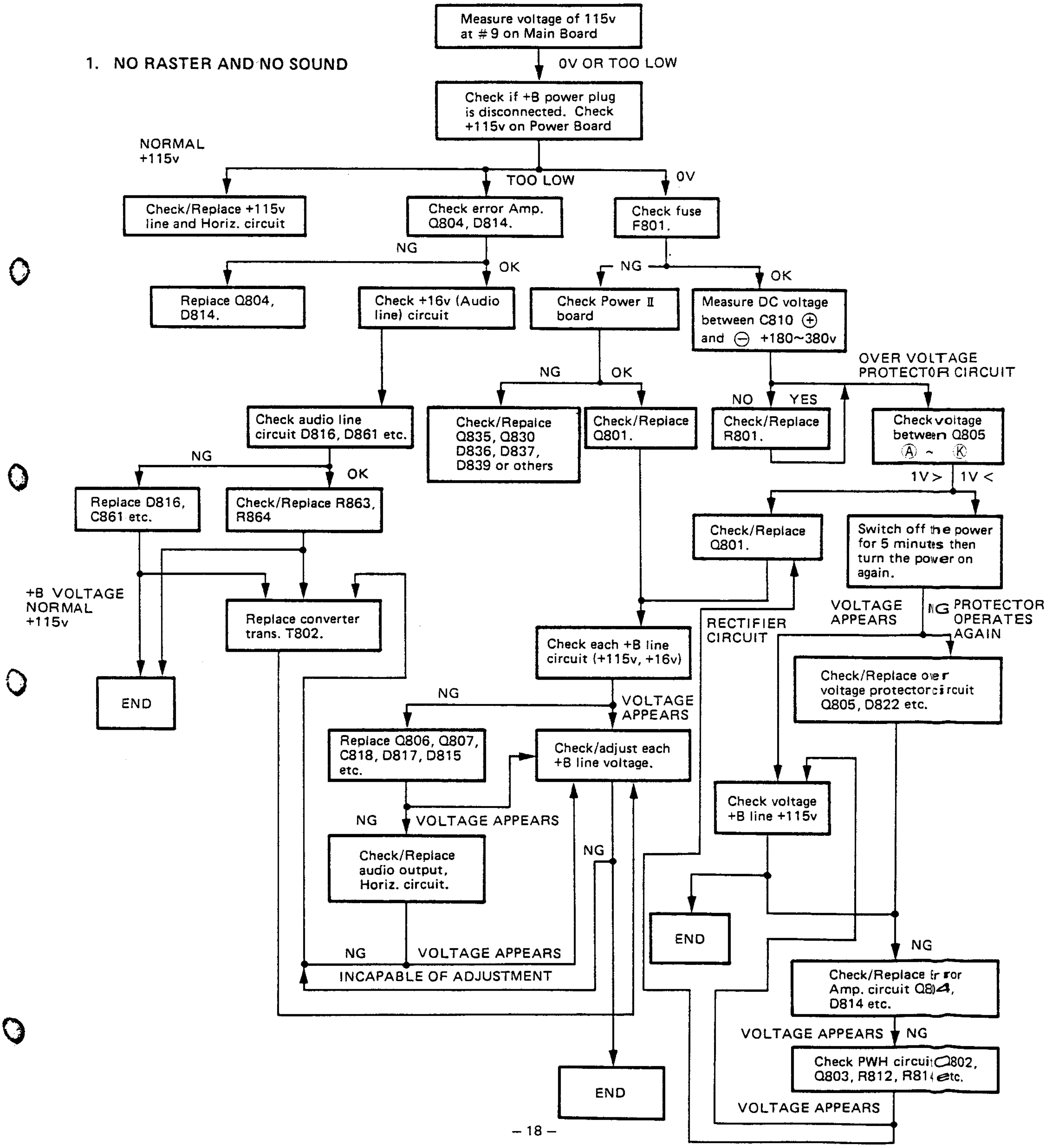


Figure 19. A/V SOUND BOARD

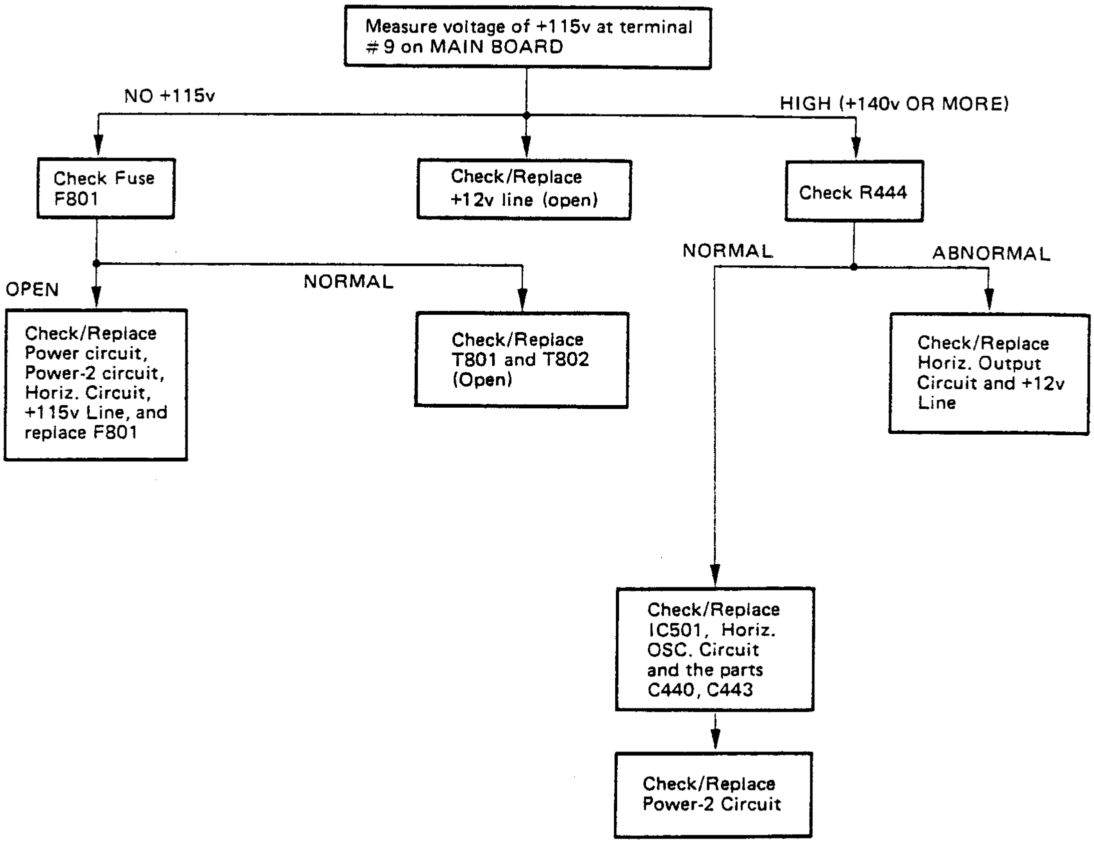
TROUBLESHOOTING CHARTS

The following charts are devoted to troubleshooting which, if followed carefully, will assist you in tracking down a fault to the correct stage.
In order to utilize the charts (fault trees), firstly establish the complaint, i.e. – No Raster, No Sound.
Locate the chart applicable and then progress through the various alternatives until a final block indicates the offending components or stage.

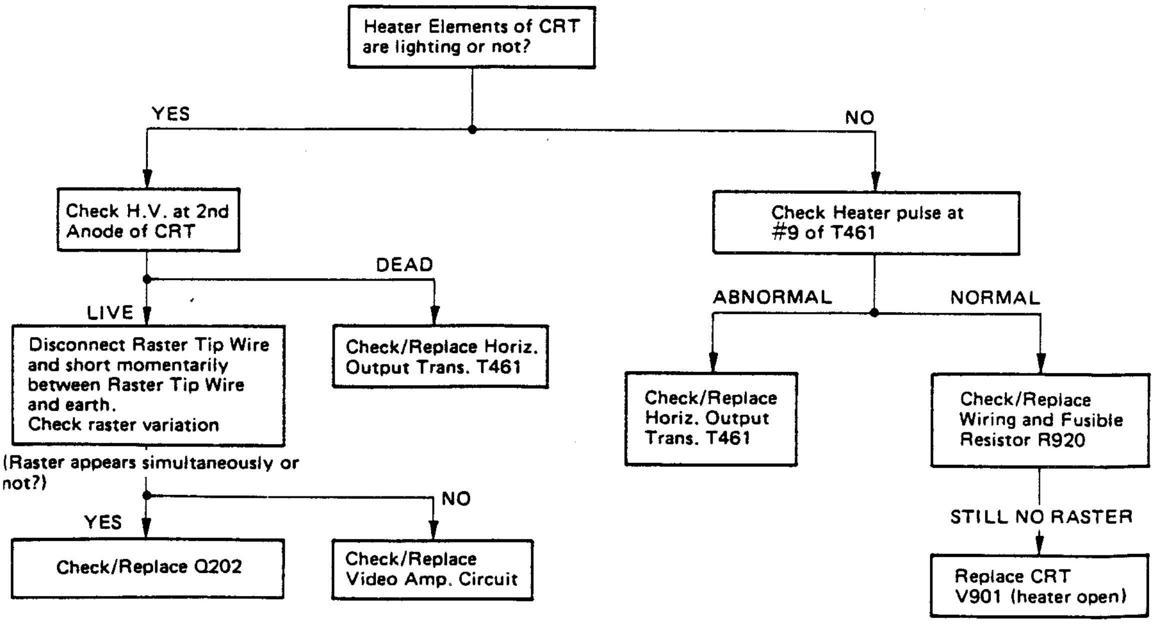
1. NO RASTER AND NO SOUND


Measure voltage of 115v at # 9 on Main Board
0V OR TOO LOW
Check if +B power plug is disconnected. Check +115v on Power Board
NORMAL +115v
TOO LOW
0V
Check/Replace +115v line and Horiz. circuit
Check error Amp. Q804, D814.
Check fuse F801.
NG
OK
Replace Q804, D814.
Check +16v (Audio line) circuit
NG
OK
Check Power II board
Measure DC voltage between C810 ⊕ and ⊖ +180~380v
OVER VOLTAGE PROTECTOR CIRCUIT
NG
OK
NO
YES
Check audio line circuit D816, D861 etc.
Check/Repalce Q835, Q830 D836, D837, D839 or others
Check/Replace Q801.
Check/Replace R801.
Check voltage between Q805 Ⓐ ~ Ⓚ
NG
OK
1V>
1V<
Replace D816, C861 etc.
Check/Replace R863, R864
Check/Replace Q801.
Switch off the power for 5 minutes then turn the power on again.
+B VOLTAGE NORMAL +115v
Replace converter trans. T802.
RECTIFIER CIRCUIT
VOLTAGE APPEARS
NG
PROTECTOR OPERATES AGAIN
Check each +B line circuit (+115v, +16v)
END
Check/Replace over voltage protector circuit Q805, D822 etc.
NG
VOLTAGE APPEARS
Replace Q806, Q807, C818, D817, D815 etc.
Check/adjust each +B line voltage.
NG
VOLTAGE APPEARS
Check voltage +B line +115v
Check/Replace audio output, Horiz. circuit.
NG
END
NG
NG
VOLTAGE APPEARS
INCAPABLE OF ADJUSTMENT
Check/Replace Error Amp. circuit Q804, D814 etc.
VOLTAGE APPEARS
NG
Check PWH circuit Q802, Q803, R812, R814 etc.
END
VOLTAGE APPEARS

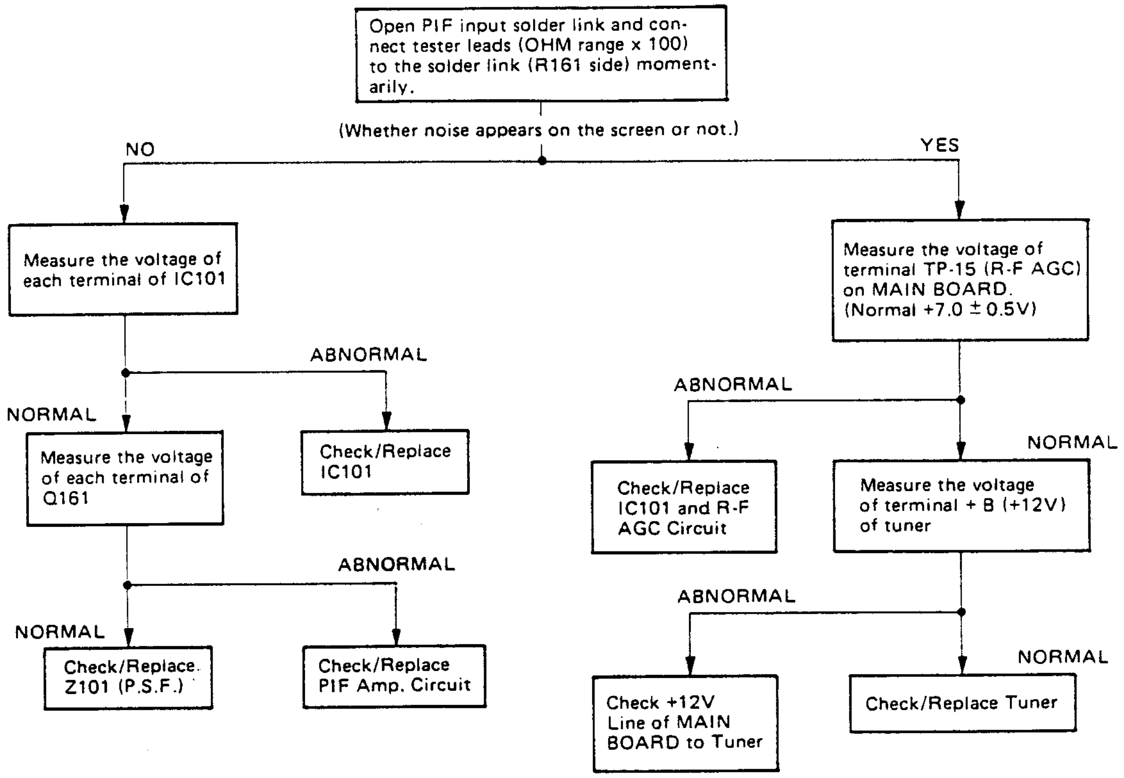
2. NO RASTER (NOISE OR WEAK SOUND)


Measure voltage of +115v at terminal #9 on MAIN BOARD
NO +115v
HIGH (+140v OR MORE)
Check Fuse F801
Check/Replace +12v line (open)
Check R444
OPEN
NORMAL
NORMAL
ABNORMAL
Check/Replace Power circuit, Power-2 circuit, Horiz. Circuit, +115v Line, and replace F801
Check/Replace T801 and T802 (Open)
Check/Replace Horiz. Output Circuit and +12v Line
Check/Replace IC501, Horiz. OSC. Circuit and the parts C440, C443
Check/Replace Power-2 Circuit

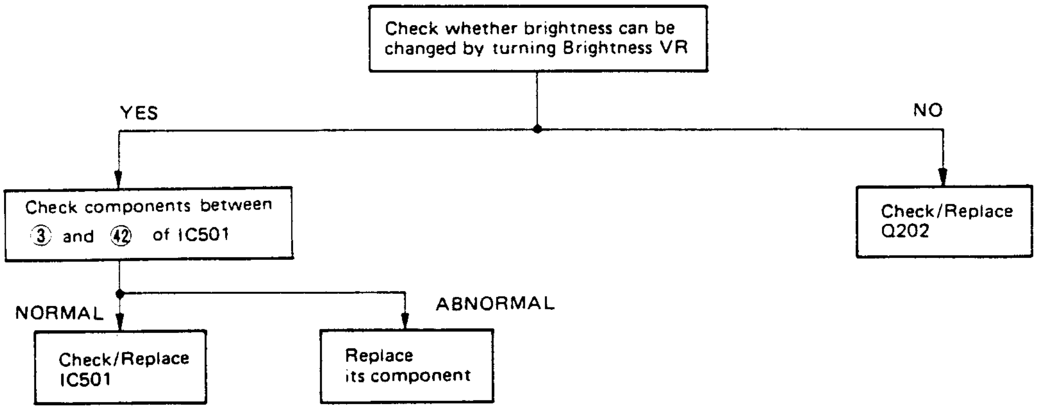
3. NO RASTER (SOUND OK)


Heater Elements of CRT are lighting or not?
YES
NO
Check H.V. at 2nd Anode of CRT
Check Heater pulse at #9 of T461
DEAD
LIVE
ABNORMAL
NORMAL
Disconnect Raster Tip Wire and short momentarily between Raster Tip Wire and earth.
Check raster variation
Check/Replace Horiz. Output Trans. T461
Check/Replace Horiz. Output Trans. T461
Check/Replace Wiring and Fusible Resistor R920
(Raster appears simultaneously or not?)
NO
YES
STILL NO RASTER
Check/Replace Q202
Check/Replace Video Amp. Circuit
Replace CRT V901 (heater open)

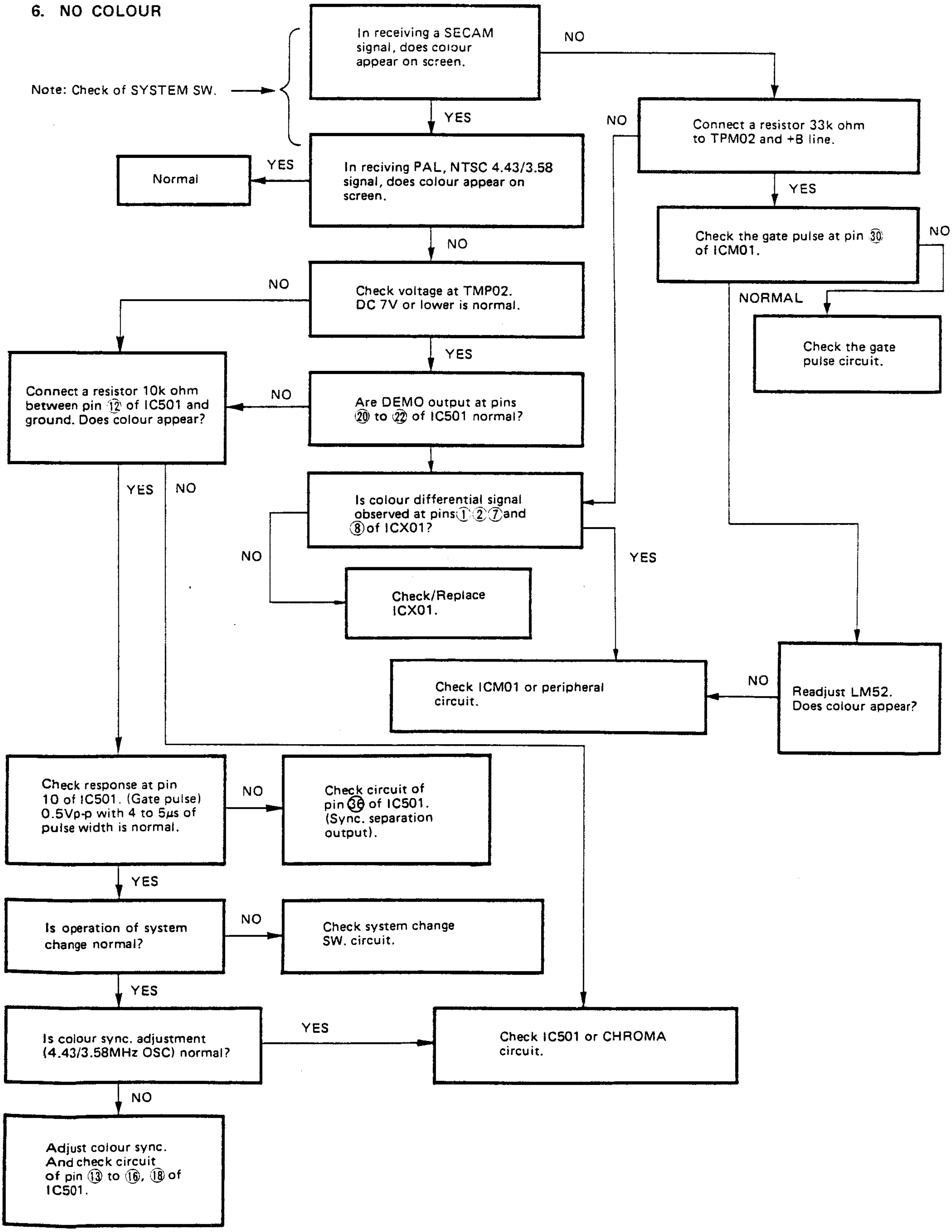
4. NO PICTURE (RASTER REMAIN) AND NO SOUND


Open PIF input solder link and connect tester leads (OHM range x 100) to the solder link (R161 side) momentarily.
(Whether noise appears on the screen or not.)
NO
YES
Measure the voltage of each terminal of IC101
ABNORMAL
NORMAL
Measure the voltage of each terminal of Q161
Check/Replace IC101
ABNORMAL
NORMAL
Check/Replace Z101 (P.S.F.)
Check/Replace PIF Amp. Circuit
Measure the voltage of terminal TP-15 (R-F AGC) on MAIN BOARD. (Normal +7.0 ± 0.5V)
ABNORMAL
NORMAL
Check/Replace IC101 and R-F AGC Circuit
Measure the voltage of terminal + B (+12V) of tuner
ABNORMAL
NORMAL
Check +12V Line of MAIN BOARD to Tuner
Check/Replace Tuner

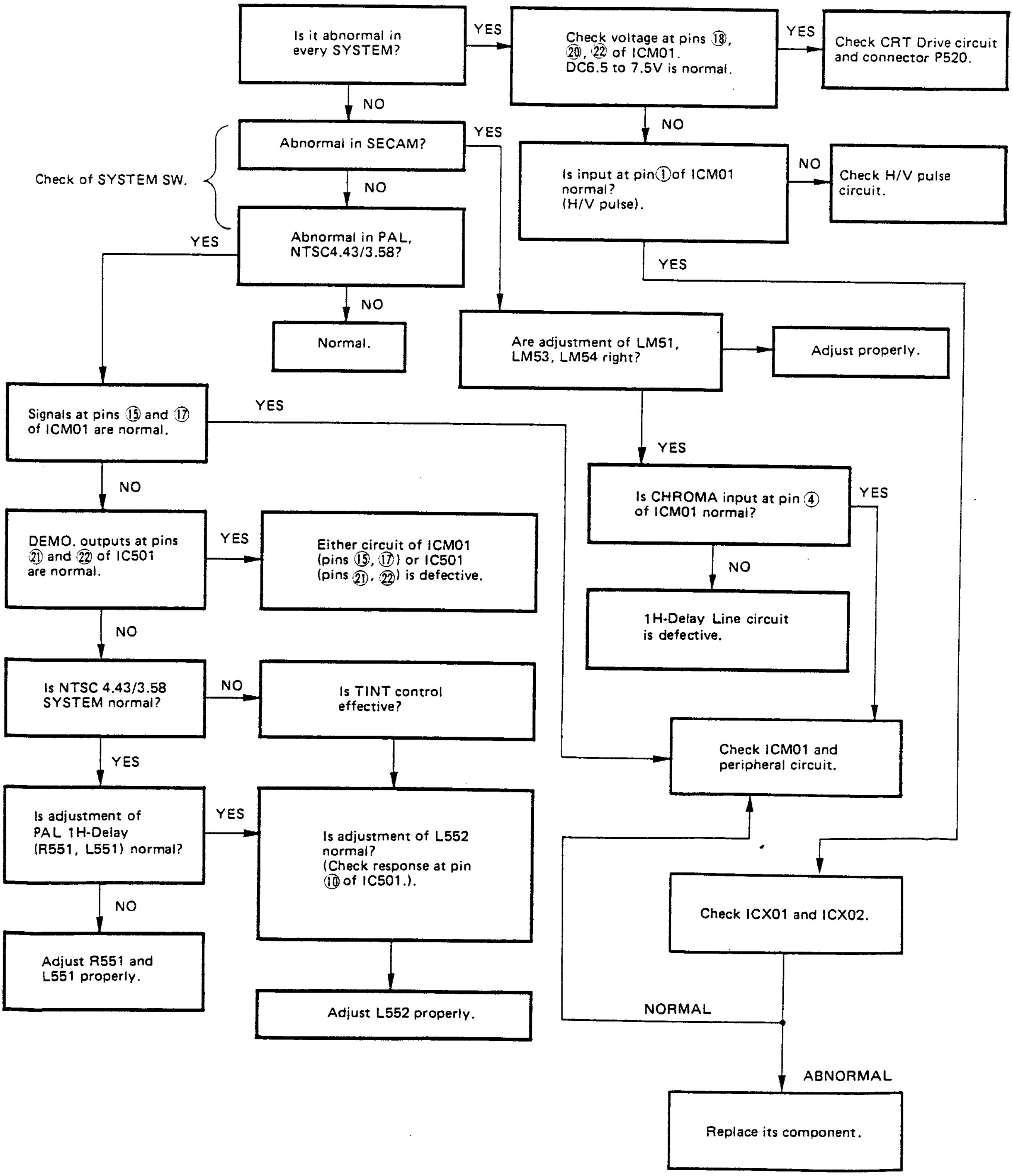
5. NO PICTURE (RASTER AND SOUND OK)


Check whether brightness can be changed by turning Brightness VR
YES
NO
Check components between ③ and ㊷ of IC501
Check/Replace Q202
NORMAL
ABNORMAL
Check/Replace IC501
Replace its component

6. NO COLOUR

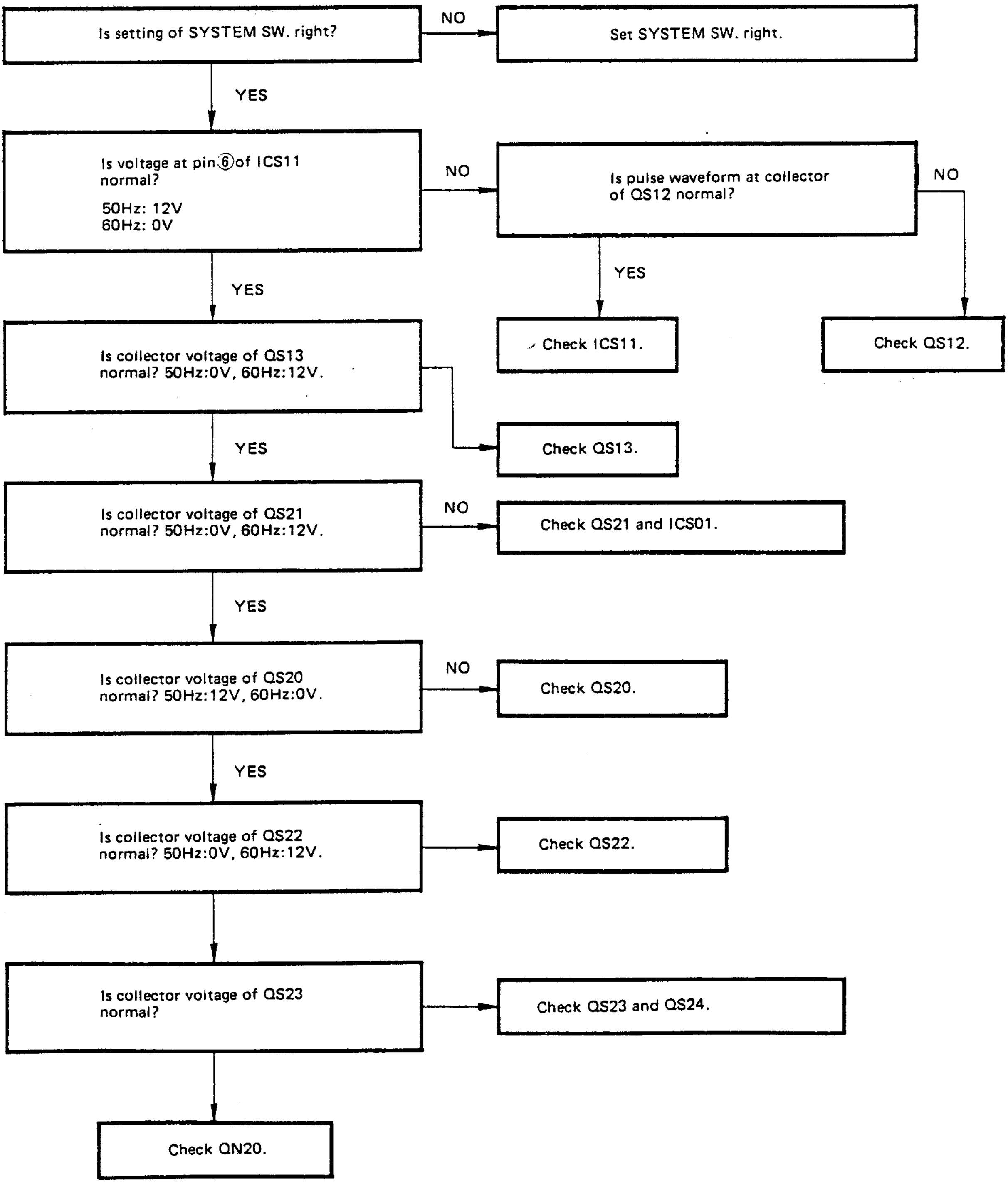

Note: Check of SYSTEM SW.
In receiving a SECAM signal, does colour appear on screen.
NO
YES
Connect a resistor 33k ohm to TPM02 and +B line.
NO
Normal
YES
In reciving PAL, NTSC 4.43/3.58 signal, does colour appear on screen.
YES
Check the gate pulse at pin ㉚ of ICM01.
NO
NO
NORMAL
NO
Check voltage at TMP02. DC 7V or lower is normal.
Check the gate pulse circuit.
YES
Connect a resistor 10k ohm between pin ⑫ of IC501 and ground. Does colour appear?
NO
Are DEMO output at pins ⑳ to ㉒ of IC501 normal?
YES
NO
Is colour differential signal observed at pins ①②⑦and ⑧of ICX01?
NO
YES
Check/Replace ICX01.
Check ICM01 or peripheral circuit.
NO
Readjust LM52. Does colour appear?
Check response at pin 10 of IC501. (Gate pulse) 0.5Vp-p with 4 to 5µs of pulse width is normal.
NO
Check circuit of pin ㊱ of IC501. (Sync. separation output).
YES
Is operation of system change normal?
NO
Check system change SW. circuit.
YES
Is colour sync. adjustment (4.43/3.58MHz OSC) normal?
YES
Check IC501 or CHROMA circuit.
NO
Adjust colour sync. And check circuit of pin ⑬ to ⑯, ⑱ of IC501.

7. SPECIFIC TINTED COLOUR


Is it abnormal in every SYSTEM?
YES
Check voltage at pins ⑱, ⑳, ㉒ of ICM01. DC6.5 to 7.5V is normal.
YES
Check CRT Drive circuit and connector P520.
NO
NO
Abnormal in SECAM?
YES
Check of SYSTEM SW.
NO
Is input at pin ① of ICM01 normal? (H/V pulse).
NO
Check H/V pulse circuit.
Abnormal in PAL, NTSC4.43/3.58?
YES
YES
NO
Normal.
Are adjustment of LM51, LM53, LM54 right?
Adjust properly.
Signals at pins ⑮ and ⑰ of ICM01 are normal.
YES
YES
NO
Is CHROMA input at pin ④ of ICM01 normal?
YES
DEMO. outputs at pins ㉑ and ㉒ of IC501 are normal.
YES
Either circuit of ICM01 (pins ⑮, ⑰) or IC501 (pins ㉑, ㉒) is defective.
NO
1H-Delay Line circuit is defective.
NO
Is NTSC 4.43/3.58 SYSTEM normal?
NO
Is TINT control effective?
YES
Check ICM01 and peripheral circuit.
Is adjustment of PAL 1H-Delay (R551, L551) normal?
YES
Is adjustment of L552 normal? (Check response at pin ⑩ of IC501.).
NO
Check ICX01 and ICX02.
Adjust R551 and L551 properly.
Adjust L552 properly.
NORMAL
ABNORMAL
Replace its component.

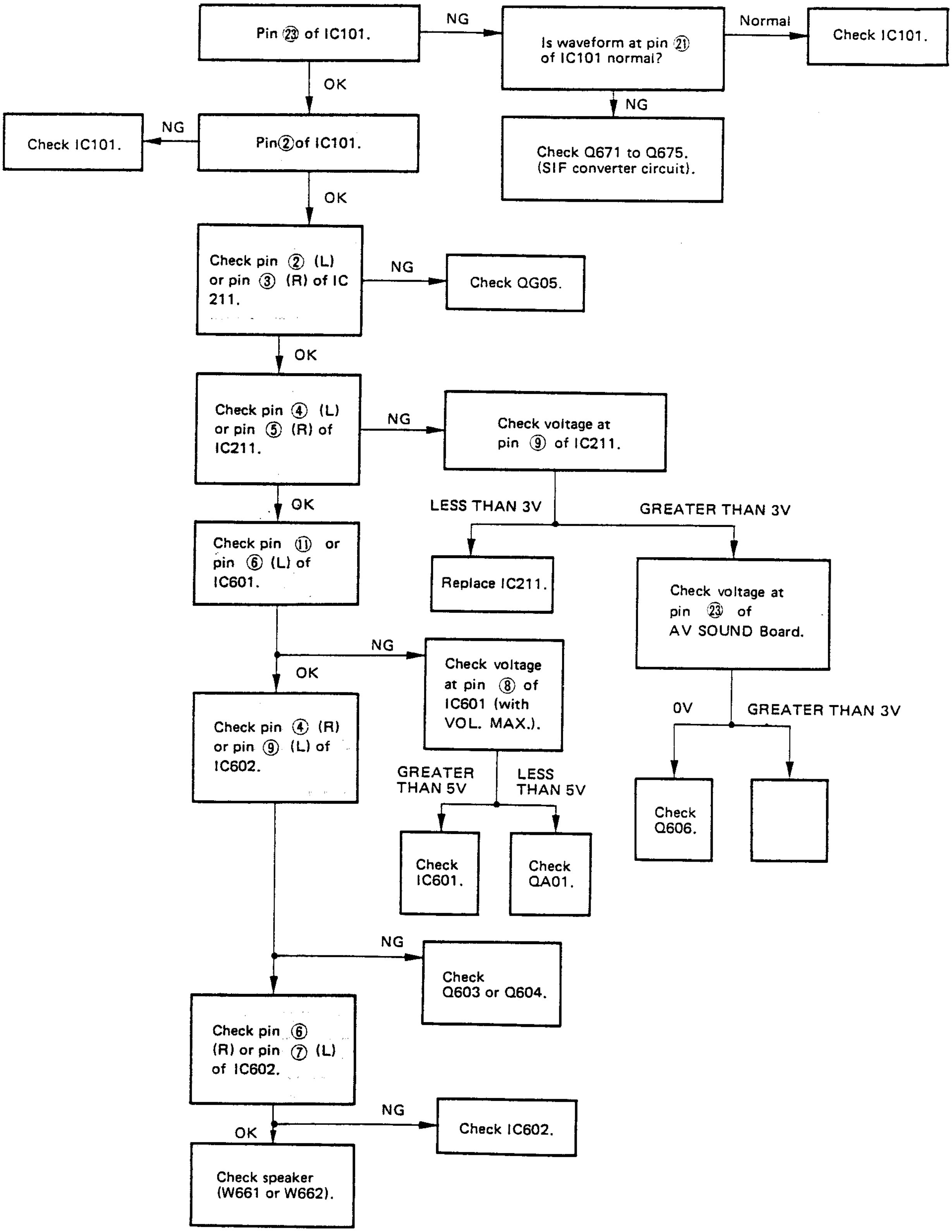
8. NO SOUND, NO COLOUR

Note: 60Hz means the system; 3.58NTSC, 55NTSC and PS60.
50Hz means the other systems than noted above.


Is setting of SYSTEM SW. right?
NO
Set SYSTEM SW. right.
YES
Is voltage at pin⑥of ICS11 normal?
50Hz: 12V
60Hz: 0V
NO
Is pulse waveform at collector of QS12 normal?
NO
YES
Check ICS11.
Check QS12.
YES
Is collector voltage of QS13 normal? 50Hz:0V, 60Hz:12V.
Check QS13.
YES
Is collector voltage of QS21 normal? 50Hz:0V, 60Hz:12V.
NO
Check QS21 and ICS01.
YES
Is collector voltage of QS20 normal? 50Hz:12V, 60Hz:0V.
NO
Check QS20.
YES
Is collector voltage of QS22 normal? 50Hz:0V, 60Hz:12V.
Check QS22.
Is collector voltage of QS23 normal?
Check QS23 and QS24.
Check QN20.

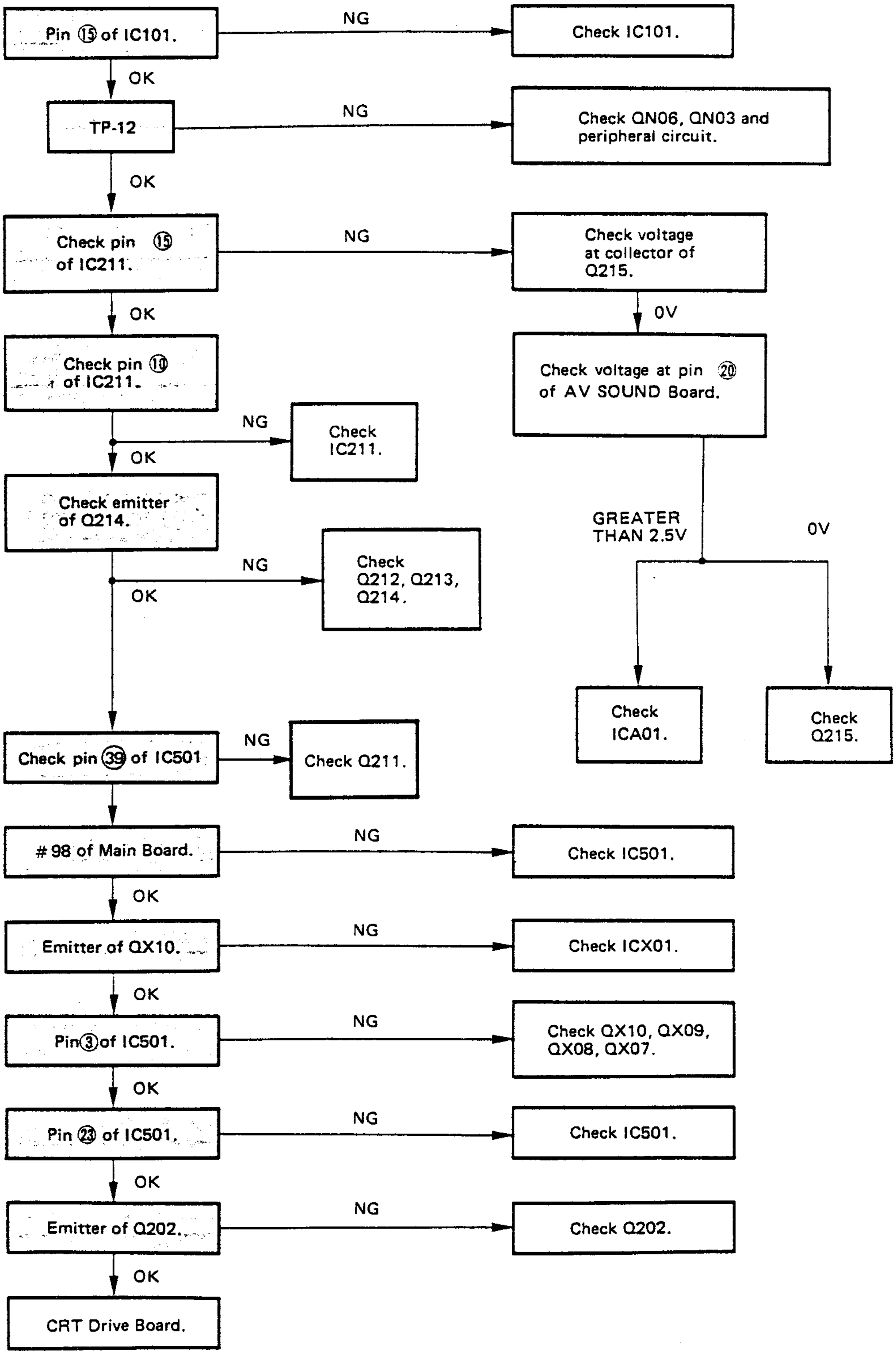
9. NO SOUND

Note: Check the sound signal waveform for shaded area below.


Pin ㉓ of IC101.
NG
Is waveform at pin ㉑ of IC101 normal?
Normal
Check IC101.
NG
Check Q671 to Q675. (SIF converter circuit).
OK
Check IC101.
NG
Pin②of IC101.
OK
Check pin ② (L) or pin ③ (R) of IC 211.
NG
Check QG05.
OK
Check pin ④ (L) or pin ⑤ (R) of IC211.
NG
Check voltage at pin ⑨ of IC211.
LESS THAN 3V
GREATER THAN 3V
Replace IC211.
Check voltage at pin ㉓ of AV SOUND Board.
0V
GREATER THAN 3V
Check Q606.
OK
Check pin ⑪ or pin ⑥ (L) of IC601.
NG
OK
Check voltage at pin ⑧ of IC601 (with VOL. MAX.).
GREATER THAN 5V
LESS THAN 5V
Check IC601.
Check QA01.
Check pin ④ (R) or pin ⑨ (L) of IC602.
NG
Check Q603 or Q604.
Check pin ⑥ (R) or pin ⑦ (L) of IC602.
NG
Check IC602.
OK
Check speaker (W661 or W662).

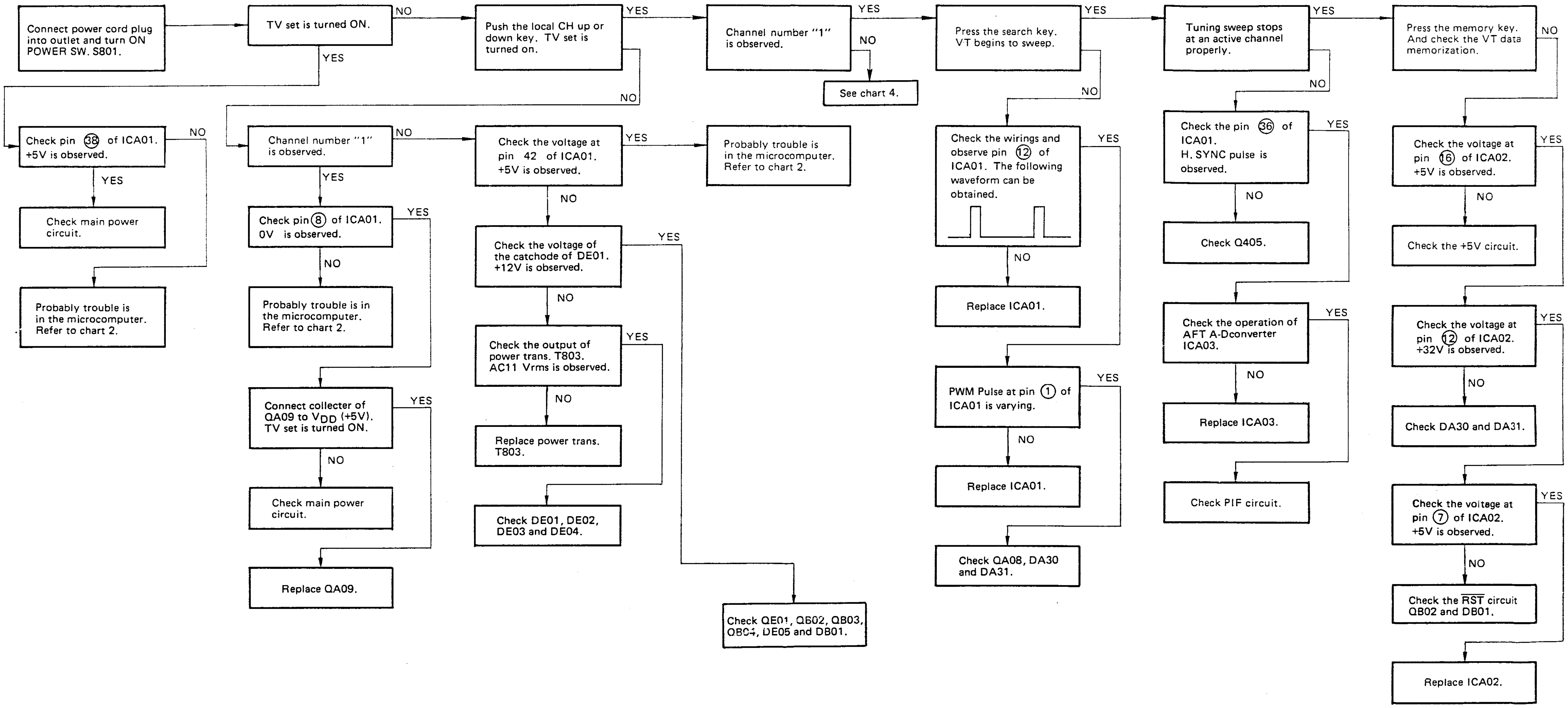
10. NO PICTURE (RASTER OK)

Note: Check video signal waveform for shaded area below.


Pin ⑮ of IC101.
NG
Check IC101.
OK
TP-12
NG
Check QN06, QN03 and peripheral circuit.
OK
Check pin ⑮ of IC211.
NG
Check voltage at collector of Q215.
0V
Check voltage at pin ⑳ of AV SOUND Board.
OK
Check pin ⑩ of IC211.
NG
Check IC211.
OK
Check emitter of Q214.
GREATER THAN 2.5V
0V
NG
Check Q212, Q213, Q214.
OK
Check ICA01.
Check Q215.
Check pin ㊴ of IC501
NG
Check Q211.
#98 of Main Board.
NG
Check IC501.
OK
Emitter of QX10.
NG
Check ICX01.
OK
Pin ③ of IC501.
NG
Check QX10, QX09, QX08, QX07.
OK
Pin ㉓ of IC501.
NG
Check IC501.
OK
Emitter of Q202.
NG
Check Q202.
OK
CRT Drive Board.

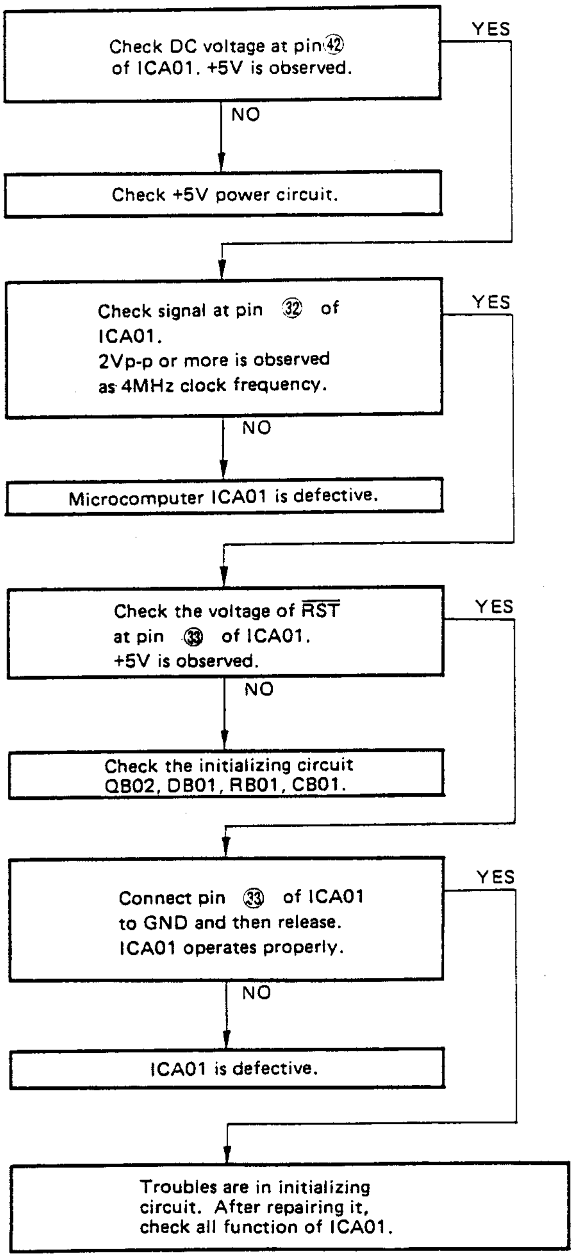
11. CHANNEL SELECTOR TROUBLE

[CHART 1]


Connect power cord plug into outlet and turn ON POWER SW. S801.
TV set is turned ON.
NO
YES
Push the local CH up or down key. TV set is turned on.
YES
NO
Channel number "1" is observed.
YES
NO
See chart 4.
Press the search key. VT begins to sweep.
YES
NO
Tuning sweep stops at an active channel properly.
YES
NO
Press the memory key. And check the VT data memorization.
NO
Check pin 38 of ICA01. +5V is observed.
NO
YES
Check main power circuit.
Probably trouble is in the microcomputer. Refer to chart 2.
Channel number "1" is observed.
NO
YES
Check pin 8 of ICA01. 0V is observed.
YES
NO
Probably trouble is in the microcomputer. Refer to chart 2.
Connect collecter of QA09 to VDD (+5V). TV set is turned ON.
YES
NO
Check main power circuit.
Replace QA09.
Check the voltage at pin 42 of ICA01. +5V is observed.
YES
NO
Probably trouble is in the microcomputer. Refer to chart 2.
Check the voltage of the catchode of DE01. +12V is observed.
YES
NO
Check the output of power trans. T803. AC11 Vrms is observed.
YES
NO
Replace power trans. T803.
Check DE01, DE02, DE03 and DE04.
Check QE01, QB02, QB03, QB04, DE05 and DB01.
Check the wirings and observe pin 12 of ICA01. The following waveform can be obtained.
YES
NO
Replace ICA01.
PWM Pulse at pin 1 of ICA01 is varying.
YES
NO
Replace ICA01.
Check QA08, DA30 and DA31.
Check the pin 36 of ICA01. H. SYNC pulse is observed.
YES
NO
Check Q405.
Check the operation of AFT A-Dconverter ICA03.
YES
NO
Replace ICA03.
Check PIF circuit.
Check the voltage at pin 16 of ICA02. +5V is observed.
YES
NO
Check the +5V circuit.
Check the voltage at pin 12 of ICA02. +32V is observed.
YES
NO
Check DA30 and DA31.
Check the voltage at pin 7 of ICA02. +5V is observed.
YES
NO
Check the RST circuit QB02 and DB01.
Replace ICA02.

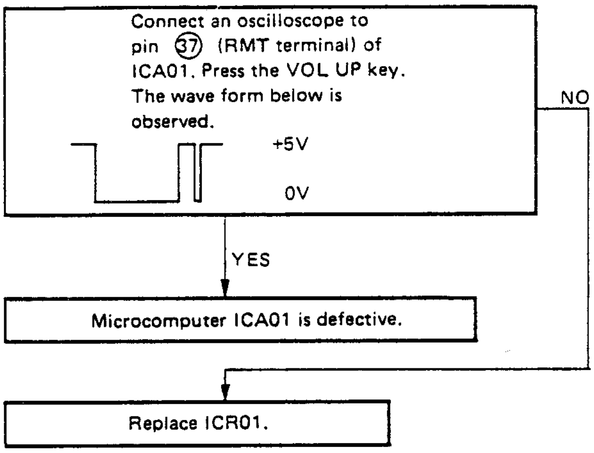
[CHART 2] Microcomputer (ICA01) Operation Check

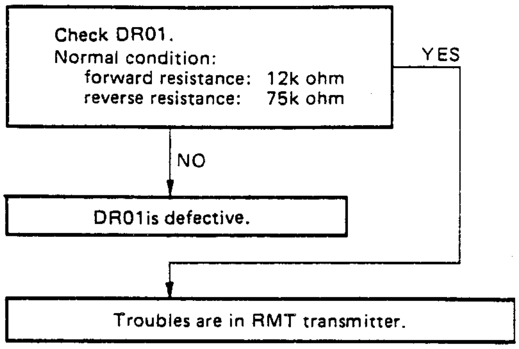
Note: Before checking Microcomputer, check that control buttons and their connection work properly.


Check DC voltage at pin ㊷ of ICA01. +5V is observed.
YES
NO
Check +5V power circuit.
Check signal at pin ㉜ of ICA01. 2Vp-p or more is observed as 4MHz clock frequency.
YES
NO
Microcomputer ICA01 is defective.
Check the voltage of $\overline{RST}$ at pin ㉝ of ICA01. +5V is observed.
YES
NO
Check the initializing circuit QB02, DB01, RB01, CB01.
Connect pin ㉝ of ICA01 to GND and then release. ICA01 operates properly.
YES
NO
ICA01 is defective.
Troubles are in initializing circuit. After repairing it, check all function of ICA01.

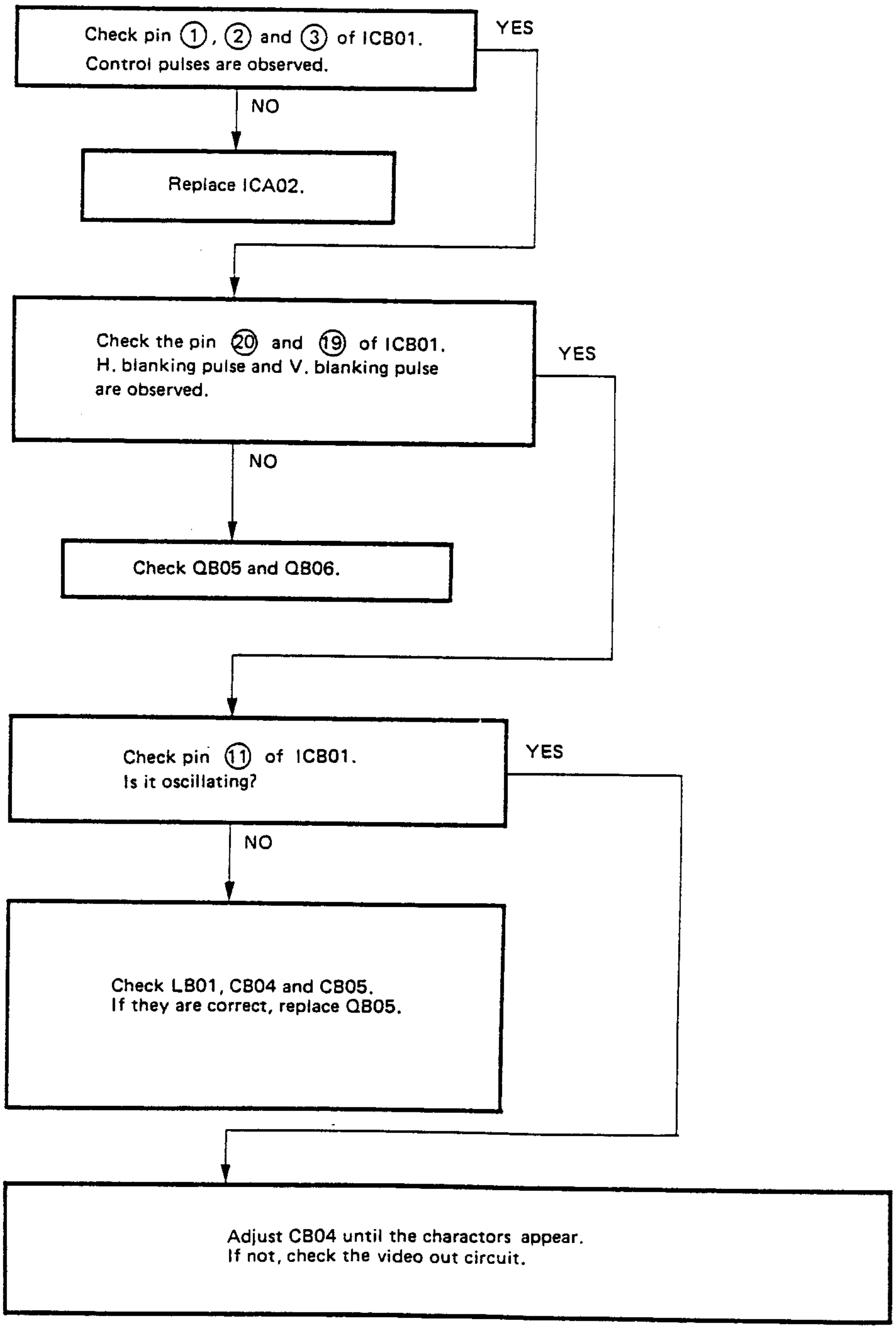
[CHART 3] Remote Control Operation Check

Note: Before checking RMT operation, check that key operation on TV set is proper.

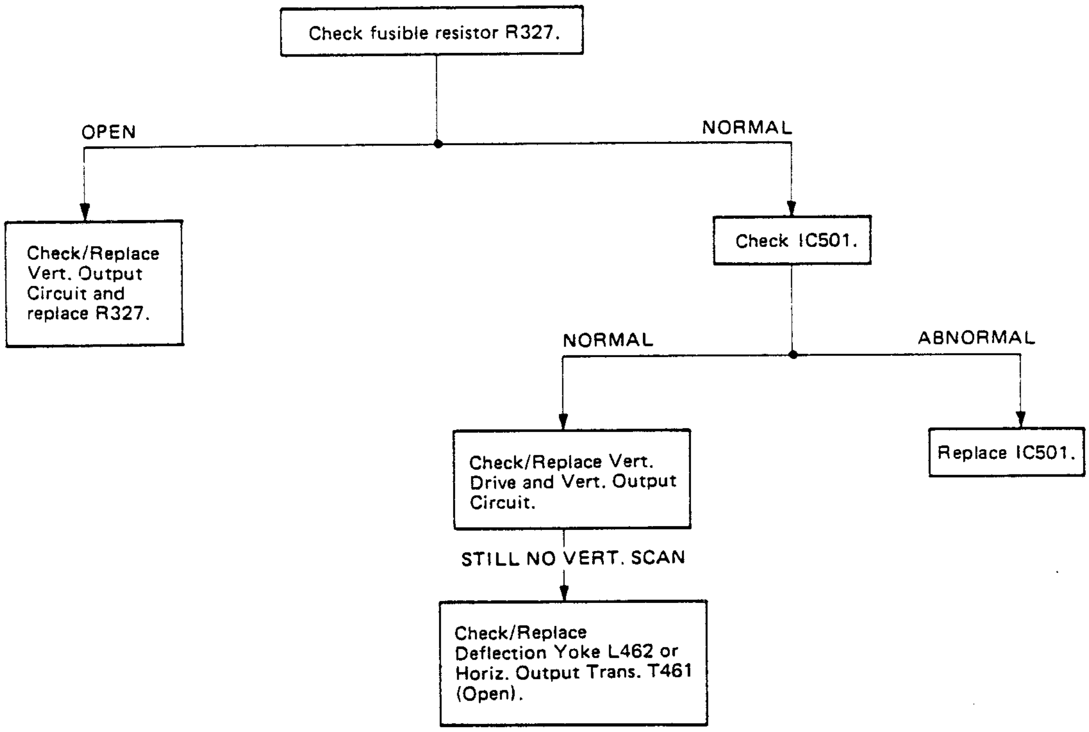

Connect an oscilloscope to pin ㊲ (RMT terminal) of ICA01. Press the VOL UP key. The wave form below is observed.
+5V
0V
NO
YES
Microcomputer ICA01 is defective.
Replace ICR01.


Check DR01.
Normal condition:
forward resistance: 12k ohm
reverse resistance: 75k ohm
YES
NO
DR01is defective.
Troubles are in RMT transmitter.

[CHART 4] On Screen Display Operation Check


Check pin ①, ② and ③ of ICB01.
Control pulses are observed.
YES
NO
Replace ICA02.
Check the pin ⑳ and ⑲ of ICB01.
H. blanking pulse and V. blanking pulse are observed.
YES
NO
Check QB05 and QB06.
Check pin ⑪ of ICB01.
Is it oscillating?
YES
NO
Check LB01, CB04 and CB05.
If they are correct, replace QB05.
Adjust CB04 until the charactors appear.
If not, check the video out circuit.

12. NO VERT. SCAN (ONE HORIZ. LINE RASTER)


Check fusible resistor R327.
OPEN
NORMAL
Check/Replace Vert. Output Circuit and replace R327.
Check IC501.
NORMAL
ABNORMAL
Check/Replace Vert. Drive and Vert. Output Circuit.
Replace IC501.
STILL NO VERT. SCAN
Check/Replace Deflection Yoke L462 or Horiz. Output Trans. T461 (Open).

13. OUT OF VERT. SYNC. AND HORIZ. SYNC.

Check/Replace Sync. Circuit from pin ㊵ of IC501 to pin ㊲ of IC501.

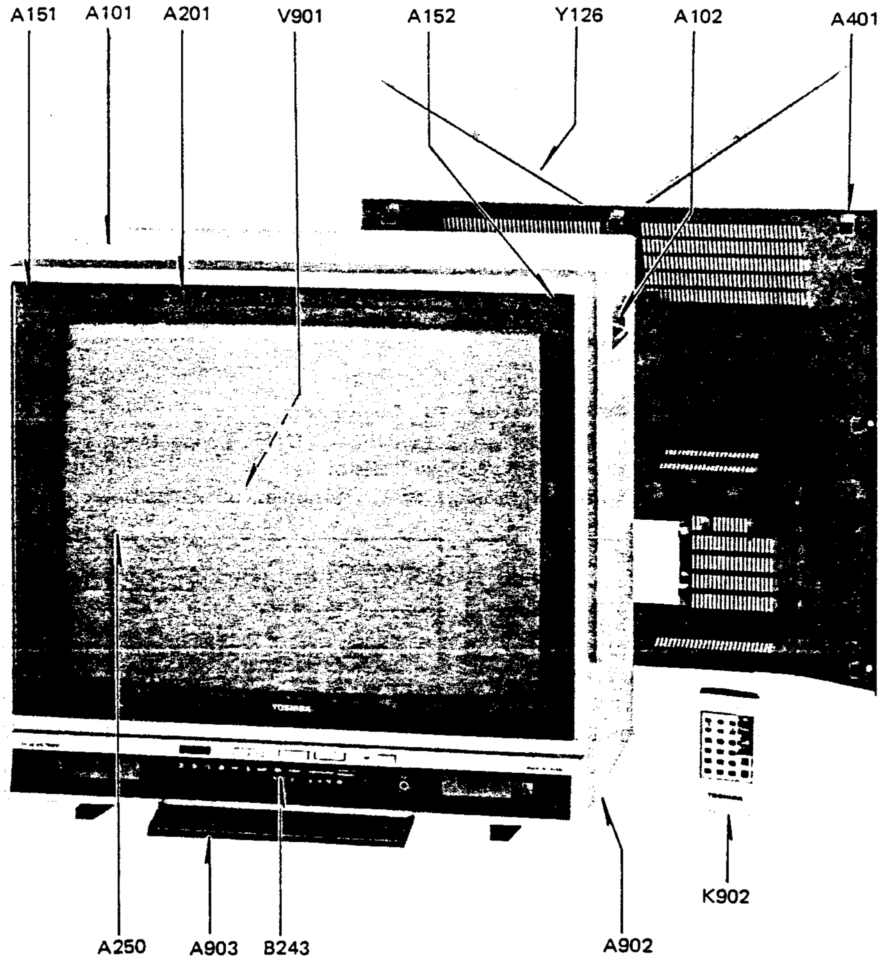
14. OUT OF VERT. SYNC.

Check/Replace Vert. OSC Circuit and Vert. Hold Circuit connected to Pins ㉖, ㉗ and ㉙ of IC501. Check/Replace IC501.

15. OUT OF HORIZ. SYNC.

Check/Replace Horiz. OSC Circuit, Horiz. Hold and Horiz. AFC Circuit connected to Pins ㉝ and ㉞ of IC501. Check/Replace IC501.

CABINET EXPLODED VIEW AND REPAIR PARTS LIST



CABINET PARTS

Location No.	Part No.	Description
A101	23887614	Cabinet, Wood
A102	23805703	Handle
A201	23415988	Bezel
A250	23827712	Filter Glass
A251	23846752	Piece, Filter Glass Holding (L)
A252	23846753	Piece, Filter Glass Holding (R)
A401	23990613	Back Cover
A406	23293977	Transformer, Aerial Matching
A701	23924634	Case, Carton
A702	23934919	Packing
A902	23885821	Control Panel
A903	23990530	Door
B242	23874506	Knob, MEMORY
K902	23120799	Remote Hand Unit, CT9108
V901	A5433139	Picture Tube, A66JLH70X(W)
Y101	23991034	Owner's Hand Book
Y126	23124971	Aerial, VHF, Telescopic

CHASSIS PARTS LIST

WARNING: BEFORE SERVICING THIS CHASSIS, READ THE "X-RAY RADIATION PRECAUTION", "SAFETY PRECAUTION" AND "PRODUCT SAFETY NOTICE" ON PAGE 1 OF THIS MANUAL.

CAUTION: The shaded areas and ⚠ marks in the schematic diagram and the parts list designate components which have special characteristics important for safety and should be replaced only with types indentical to those in the original circuit or specified in the parts list. The mounting position of replacements is to be identical with originals. Before replacing any of these components, read carefully the PRODUCT SAFETY NOTICE on page 1. Do not degrade the safety of the receiver through improper servicing.

NOTICE: The part number must be used when ordering parts, in order to assist in processing, be sure to include the Model number and Description.

ABBREVIATIONS:

Capacitors . . . . CD: Ceramic Disk, PF: Plastic Film, EL: Electrolytic
Resistors . . . . . CF: Carbon Film, CC: Carbon Composition, OMF: Oxide Metal Film, VR: Variable Resistor. MF: Metal Film, FR: Fusible Resistor
(All CD and PF capacitors are ±5%, 50v and all resistors, ±5%, 1/6w unless otherwise noted.)

Location No.	Part No.	Description
CAPACITORS		
C101	24232103	CD, 0.01μF, +80%, -20%
C102	24212102	CD, 1000pF, ±10%
C103	24232103	CD, 0.01μF, +80%, -20%
C104	24232103	CD, 0.01μF, +80%, -20%
C106	24617969	EL, 0.22μF, 50V
C107	24636100	EL, 10μF, 50V
C108	24232103	CD, 0.01μF, +80%, -20%
C109	24232103	CD, 0.01μF, +80%, -20%
C111	24212222	CD, 2200pF, ±10%
C161	24232103	CD, 0.01μF, +80%, -20%
C162	24232103	CD, 0.01μF, +80%, -20%
C163	24232103	CD, 0.01μF, +80%, -20%
C171	24212102	CD, 1000pF, ±10%
C172	24212102	CD, 1000pF, ±10%
C174	24436150	CD, 15pF
C175	24436020	CD, 2pF, ±0.25pF
C176	24436020	CD, 2pF, ±0.25pF
C202	24436820	CD, 82pF
C204	24085031	EL, 1μF, ±20%, 25V, Non-Polar
C206	24636479	EL, 4.7μF, 50V
C207	24633220	EL, 22μF, 16V
C208	24633470	EL, 47μF, 16V
C209	24538104	PF, 0.1μF
C240	24636479	EL, 4.7μF, 50V
C261	24636010	EL, 1μF, 50V
C262	24636010	EL, 1μF, 50V
C263	24636100	EL, 10μF, 50V
C264	24633470	EL, 47μF, 16V
C265	24633221	EL, 220μF, 16V
C266	24085032	EL, 3.3μF, 16V, Non-Polar
C267	24636100	EL, 10μF, 50V
C268	24636229	EL, 2.2μF, 50V
C269	24636100	EL, 10μF, 50V
C301	24636010	EL, 1μF, 50V
C302	24232103	CD, 0.01μF, +80%, -20%
C303	24212561	CD, 560pF, ±10%
C304	24598122	PF, 1200pF
C305	24538333	PF, 0.033μF
C306	24538224	PF, 0.22μF
C307	24436680	CD, 68pF
C308	24617967	EL, 2.2μF, ±10%, 50V
C310	24636478	EL, 0.47μF, 50V
C311	24757221	EL, 220μF, 100V
C312	24755220	EL, 22μF, 35V
C313	24640967	EL, 4.7μF, 250V
C314	24232103	CD, 0.01μF, +80%, -20%
C316	24757101	EL, 100μF, 100V
C317	24617967	EL, 0.22μF, ±10%, 50V
C318	24214152	CD, 1500pF, ±10%, 500V
C319	24636478	EL, 0.47μF, 50V
C320	24095987	PF, 1200pF, 1600V
C321	24829273	PF, 0.027μF, 400V
C322	24212391	CD, 390pF, ±10%
C323	24214472	CD, 4700pF, 500V
C324	24214391	CD, 390pF, ±10%, 500V
C371	24593682	PF, 6800pF
C401	24593912	PF, 9100pF
C402	24636478	EL, 0.47μF, 50V
C403	24593562	PF, 5600pF
C405	24598302	PF, 3000pF
C406	24636010	EL, 1μF, 50V
C407	24636010	EL, 1μF, 50V
C408	24636100	EL, 10μF, 50V
C409	24232103	CD, 0.01μF, +80%, -20%
C410	24212152	CD, 1500pF, ±10%

Location No.	Part No.	Description
C411	24232103	CD, 0.01μF, +80%, -20%
C416	24214391	CD, 390pF, ±10%, 500V
C417	24214222	CD, 2200pF, ±10%, 500V
C418	24757101	EL, 100μF, 100V
C420	24212681	CD, 680pF, ±10%
C421	24212152	CD, 1500pF, ±10%
C422	24593182	PF, 1800pF
C423	24633101	EL, 100μF, 16V
⚠ C440	24095916	PF, 9100pF, 1600V
C441	24214221	CD, 220pF, ±10%, 500V
⚠ C442	24095962	PF, 0.47μF, 200V
C443	24095915	PF, 0.01μF, 1600V
C445	24833563	PF, 0.056μF, ±10%, 200V
C446	24640973	EL, 100μF, 160V
C447	24758470	EL, 33μF, 160V
C448	24754222	EL, 2200μF, 25V
C449	24633102	EL, 1000μF, 16V
⚠ C463	24212222	CD, 2200pF, ±10%
C464	24442101	CD, 100pF, ±10%, 2kV
C501	24436150	CD, 15pF
C502	24436100	CD, 10pF, ±0.25pF
C504	24636010	EL, 1μF, 50V
C506	24232103	CD, 0.01μF, +80%, -20%
C507	24232103	CD, 0.01μF, +80%, -20%
C508	24340160	CD, 16pF, ±10%
C509	24232103	CD, 0.01μF, +80%, -20%
C510	24232103	CD, 0.01μF, +80%, -20%
C511	24232103	CD, 0.01μF, +80%, -20%
C513	24232103	CD, 0.01μF, +80%, -20%
C514	24636478	EL, 0.47μF, 50V
C515	24436200	CD, 20pF
C516	24436080	CD, 8pF, ±0.25pF
C517	24353680	CD, 68pF
C518	24538223	PF, 0.022μF
C519	24636100	EL, 10μF, 50V
C520	24636100	EL, 10μF, 50V
C521	24538223	PF, 0.022μF
C522	24232103	CD, 0.01μF, +80%, -20%
C523	24538473	PF, 0.047μF
C524	24436270	CD, 27pF
C527	24636100	EL, 10μF, 50V
C531	24212391	CD, 390pF, ±10%
C532	24212391	CD, 390pF, ±10%
C533	24212391	CD, 390pF, ±10%
C551	24093990	Variable Capacitor, 5.5~30pF, 100V
C601	24436470	CD, 47pF
C602	24436470	CD, 47pF
C603	24232103	CD, 0.01μF, +80%, -20%
C604	24593562	PF, 5600pF
C606	24636479	EL, 4.7μF, 50V
C610	24593472	PF, 4700pF

Location No.	Part No.	Description
C611	24538124	PF, 0.12μF
C612	24636479	EL, 4.7μF, 50V
C613	24636229	EL, 2.2μF, 50V
C614	24636479	EL, 4.7μF, 50V
C615	24636479	EL, 4.7μF, 50V
C616	24633470	EL, 47μF, 16V
C617(U902)	24353620	CD, 62pF
C617(U903)	24593203	PF, 2000pF
C618	24593472	PF, 4700pF
C619	24633470	EL, 47μF, 16V
C620	24636479	EL, 4.7μF, 50V
C623	24633101	EL, 100μF, 16V
C624	24633101	EL, 100μF, 16V
C625	24754222	EL, 2200μF, 25V
C626	24436101	CD, 100pF
C627	24633101	EL, 100μF, 16V
C628	24538223	PF, 0.022μF
C629	24795101	EL, 100μF, 25V
C630	24795101	EL, 100μF, 25V
C631	24633101	EL, 100μF, 16V
C632	24436101	CD, 100pF
C633	24538223	PF, 0.022μF
C634	24436221	CD, 220pF
C635	24634101	EL, 100μF, 25V
C636	24538104	PF, 0.1μF
C637	24538104	PF, 0.1μF
C638	24436221	CD, 220pF
C639	24636100	EL, 10μF, 50V
C640	24636100	EL, 10μF, 50V
C641	24636100	EL, 10μF, 50V
C642	24754471	EL, 470μF, 25V
C643	24754471	EL, 470μF, 25V
C644	24633470	EL, 47μF, 16V
C671	24232103	CD, 0.01μF, +80%, -20%
C672	24357241	CD, 240pF
C674	24232103	CD, 0.01μF, +80%, -20%
C675	24538104	PF, 0.1μF
C677	24357271	CD, 270pF
C678	24436101	CD, 100pF
C679	24232103	CD, 0.01μF, +80%, -20%
C680	24436270	CD, 27pF
C681	24357101	CD, 100pF, ±0.25pF
C682	24538103	PF, 0.01μF
C683	24212821	CD, 820pF, ±10%
C684	24436391	CD, 390pF
C685	24794101	EL, 100μF, 16V
⚠ C801	24095951	PF, 0.1μF, 250V
⚠ C802	24095951	PF, 0.1μF, 250V
⚠ C803	24094839	CD, 1000pF, ±10%, AC400V
⚠ C804	24094839	CD, 1000pF, ±10%, AC400V
⚠ C805	24086977	EL, 240μF, 400V
C806	24538474	PF, 0.47μF

Location No.	Part No.	Description
⚠ C807	24094841	CD, 220pF, AC400V
C809	24095931	PF, 2200pF,1600V
⚠ C810	24086977	EL, 240μF, 400V
C811	24538474	PF, 0.47μF
C812	24756010	EL, 1μF, 50V
C813	24598242	PF, 2400pF
C814	24212102	CD, 1000pF, ±10%
C815	24756479	EL, 4.7μF, 50V
C816	24758100	EL, 10μF, 160V
C817	24215181	CD, 180pF, ±10%, 1kV
C818	24086953	EL, 2200μF, 160V
C820	24754222	EL, 2200μF, 25V
C821	24630960	EL, 47μF, 50V
C825	24867303	PF, 0.03μF
C826	24756470	EL, 47μF, 50V
⚠ C831	24094906	CD, 4700pF, +80%, -20%, AC250V
⚠ C832	24094906	CD, 4700pF, +80%, -20%, AC250V
⚠ C833	24094906	CD, 4700pF, +80%, -20%, AC250V
⚠ C834	24094906	CD, 4700pF, +80%, -20%, AC250V
⚠ C835	24086975	EL, 220μF, 200V
C836	24094905	CD, 0.01μF, +80%, -20%, AC250V
C837	24232103	CD, 0.01μF, +80%, -20%
C838	24636100	EL, 10μF, 50V
C839	24232103	CD, 0.01μF, +80%, -20%
⚠ C840	24640968	EL, 10μF, 400V
C841	24086975	EL, 220μF, 200V
C861	24754222	EL, 2200pF, 25V
C862	24442102	CD, 100pF, ±10%, 2kV
C863	24212102	CD, 1000pF, ±10%
C901	24640976	EL, 2.2μF, 315V
C901	or 24640987	EL, 2.2μF, 350V
C902	24095981	PF, 2200pF, 1600V
C902	or 24095931	PF, 2200pF, 1600V
CA01	24633470	EL, 47μF, 16V
CA02	24232103	CD, 0.01μF, +80%, -20%
CA03	24633100	EL, 10μF, 16V
CA04	24232103	CD, 0.01μF, +80%, -20%
CA05	24436101	CD, 100pF
CA06	24232103	CD, 0.01μF, +80%, -20%
CA07	24232103	CD, 0.01μF, +80%, -20%
CA08	24636100	EL, 10μF, 50V
CA09	24436101	CD, 100pF
CA10	24538104	PF, 0.1μF
CA11	24538104	PF, 0.1μF
CA15	24085028	EL, 2.2μF, 25V, Non-Polar
CA16	24636229	EL, 2.2μF, 50V

Location No.	Part No.	Description
CA17	24538104	PF, 0.1μF
CA18	24636229	EL, 2.2μF, 50V
CA19	24232103	CD, 0.01μF, +80%, -20%
CA20	24636100	EL, 10μF, 50V
CA21	24232103	CD, 0.01μF, +80%, -20%
CA22	24232103	CD, 0.01μF, +80%, -20%
CA23	24636339	EL, 3.3μF, 50V
CA25	24232103	CD, 0.01μF, +80%, -20%
CA26	24636339	EL, 3.3μF, 50V
CA27	24232103	CD, 0.01μF, +80%, -20%
CA28	24232103	CD, 0.01μF, +80%, -20%
CA30	24085030	EL, 0.47μF, 25V, Non-Polar
CA32	24232103	CD, 0.01μF, +80%, -20%
CA33	24436221	CD, 220pF
CA34	24436391	CD, 390pF
CB04	24094941	Variable Capacitor, 5~55pF, 50V
CB05	24436240	CD, 24pF
CB09	24436101	CD, 100pF
CB20	24436221	CD, 220pF
CB21	24436101	CD, 100pF
CB22	24436820	CD, 82pF
CB23	24436101	CD, 100pF
CB25	24212102	CD, 1000pF, ±10%
CB26	24436101	CD, 100pF
CB27	24633100	EL, 10μF, 16V
CB28	24436101	CD, 100pF
CE02	24797471	EL, 470μF, 50V
CE03	24797470	EL, 47μF, 50V
CE04	24797470	EL, 47μF, 50V
CE05	24797470	EL, 47μF, 50V
CE06	24755100	EL, 10μF, 35V
CG31	24636479	EL, 4.7μF, 50V
CG32	24538103	PF, 0.01μF
CG33	24636100	EL, 10μF, 50V
CG34	24538224	PF, 0.22μF
CG35	24636479	EL, 4.7μF, 50V
CG36	24636010	EL, 1μF, 50V
CG37	24636010	EL, 1μF, 50V
CG38	24636010	EL, 1μF, 50V
CG39	24636010	EL, 1μF, 50V
CG40	24636100	EL, 10μF, 50V
CG41	24636100	EL, 10μF, 50V
CM01	24357220	CD, 22pF
CM02	24436101	CD, 100pF
CM03	24436101	CD, 100pF
CM04	24436151	CD, 150pF
CM05	24436151	CD, 150pF
CM06	24436151	CD, 150pF
CM07	24636010	EL, 1μF, 50V
CM09	24232103	CD, 0.01μF, +80%, -20%

Location No.	Part No.	Description
CM10	24232103	CD, 0.01μF, +80%, -20%
CM11	24636478	EL, 0.47μF, 50V
CM14	24232103	CD, 0.01μF, +80%, -20%
CM15	24636010	EL, 1μF, 50V
CM17	24636010	EL, 1μF, 50V
CM19	24636010	EL, 1μF, 50V
CM21	24633100	EL, 10μF, 16V
CM23	24633100	EL, 10μF, 16V
CM25	24212821	CD, 820pF, ±10%
CM26	24232103	CD, 0.01μF, +80%, -20%
CM27	24636010	EL, 1μF, 50V
CM28	24359390	CD, 39pF
CM29	24359680	CD, 68pF
CM31	24436271	CD, 270pF
CM32	24212681	CD, 680pF, ±10%
CM33	24359390	CD, 39pF
CM34	24359560	CD, 56pF
CM36	24436271	CD, 270pF
CM38	24633100	EL, 10μF, 16V
CM39	24633100	EL, 10μF, 16V
CM40	24633331	EL, 330μF, 16V
CM41	24232103	CD, 0.01μF, +80%, -20%
CM43	24232103	CD, 0.01μF, +80%, -20%
CM44	24232103	CD, 0.01μF, +80%, -20%
CM45	24633470	EL, 47μF, 16V
CM60	24232103	CD, 0.01μF, +80%, -20%
CM62	24436391	CD, 390pF
CM63	24436391	CD, 390pF
CM66	24232103	CD, 0.01μF, +80%, -20%
CM70	24357820	CD, 82pF
CM71	24212821	CD, 820pF, ±10%
CM73	24593122	PF, 1200pF
CN02	24232103	CD, 0.01μF, +80%, -20%
CN07	24232103	CD, 0.01μF, +80%, -20%
CN08	24232103	CD, 0.01μF, +80%, -20%
CN09	24353620	CD, 62pF
CN10	24232103	CD, 0.01μF, +80%, -20%
CN11	24636100	EL, 10μF, 50V
CN20	24436070	CD, 7pF, ±0.25pF
CN21	24232103	CD, 0.01μF, +80%, -20%
CN22	24232103	CD, 0.01μF, +80%, -20%
CN24	24436050	CD, 5pF, ±0.25pF
CN25	24636100	EL, 10μF, 50V
CN26	24636100	EL, 10μF, 50V
CN27	24436560	CD, 56pF, ±0.25pF
CN30	24232103	CD, 0.01μF, +80%, -20%
CN51	24093990	Variable Capacitor, 5.5~30pF, 100V
CN52	24093990	Variable Capacitor, 5.5~30pF, 100V
CN71	24232103	CD, 0.01μF, +80%, -20%
CN72	24356820	CD, 82pF

Location No.	Part No.	Description
CN73	24232103	CD, 0.01μF, +80%, -20%
CN74	24232103	CD, 0.01μF, +80%, -20%
CR01	24501222	PF, 2200pF
CR02	24538683	PF, 0.068μF
CR03	24203100	EL, 10μF, 16V
CR04	24202330	EL, 33μF, 16V
CR05	24203100	EL, 10μF, 16V
CR06	24203101	EL, 100μF, 16V
CR07	24593222	PF, 2200pF
CS08	24232103	CD, 0.01μF, +80%, -20%
CS09	24633100	EL, 10μF, 16V
CS11	24636010	EL, 1μF, 50V
CS14	24636010	EL, 1μF, 50V
CS15	24085031	EL, 1μF, ±20%, 25V, Non-Polar
CX01	24538334	PF, 0.33μF
CX02	24538334	PF, 0.33μF
CX03	24436101	CD, 100pF
CX04	24436101	CD, 100pF
CX05	24436331	CD, 330pF
CX06	24436221	CD, 220pF
CX07	24436221	CD, 220pF
CX08	24538104	PF, 0.1μF
CX09	24636100	EL, 10μF, 50V
CX10	24538334	PF, 0.33μF
CX11	24636100	EL, 10μF, 50V
CX12	24232103	CD, 0.01μF, +80%, -20%
CX13	24212102	CD, 1000pF, ±10%
CX14	24636479	EL, 4.7μF, 50V
CX15	24636100	EL, 10μF, 50V
CX17	24633101	EL, 100μF, 16V
CX19	24633471	EL, 470μF, 16V
RESISTORS		
R101	24366821	CF, 820 ohm
R104	24366683	CF, 68k ohm
R105	24366221	CF, 220 ohm
R107	24366824	CF, 820k ohm
R108	24366392	CF, 3900 ohm
R109	24366332	CF, 3300 ohm
R151	24066953	VR, 5k ohm, 1/10W
R152	24066946	VR, 1M ohm, 1/10W
R161	24366131	CF, 130 ohm
R162	24366102	CF, 1k ohm
R163	24366562	CF, 5600 ohm
R164	24366221	CF, 220 ohm
R165	24366471	CF, 470 ohm
R166	24366270	CF, 27 ohm
R167	24366680	CF, 68 ohm
R171	24366122	CF, 1200 ohm
R172	24366122	CF, 1200 ohm
R201	24366151	CF, 150 ohm
R202	24366821	CF, 820 ohm

Location No.	Part No.	Description
R203	24366162	CF, 1600 ohm
R204	24366122	CF, 1200 ohm
R205	24552331	OMF, 330 ohm, 1/2W
R207	24366101	CF, 100 ohm
R209	24366363	CF, 36k ohm
R210	24366162	CF, 1600 ohm
R212	24360103	CF, 10k ohm, 1/8W
R213	24366183	CF, 18k ohm
R214	24366222	CF, 2200 ohm
R215	24360101	CF, 100 ohm, 1/8W
R216	24360563	CF, 56k ohm, 1/8W
R217	24366301	CF, 300 ohm
R218	24366824	CF, 820k ohm
R219	24553241	OMF, 240 ohm, 1W
R221	24366101	CF, 100 ohm
R222	24366102	CF, 1k ohm
R223	24360822	CF, 8200 ohm, 1/8W
R224	24366222	CF, 2200 ohm
R233	24366220	CF, 22 ohm
R234	24360220	CF, 22 ohm, 1/8W
R235	24360682	CF, 6800 ohm, 1/8W
R236	24366561	CF, 560 ohm
R237	24360153	CF, 15k ohm, 1/8W
R239	24366334	CF, 330 ohm
R240	24366473	CF, 47k ohm
R241	24360124	CF, 120k ohm, 1/8W
R242	24366152	CF, 1500 ohm
R243	24366222	CF, 2200 ohm
R244	24360153	CF, 15k ohm, 1/8W
R247	24360272	CF, 2700 ohm, 1/8W
R248	24366562	CF, 5600 ohm
R252	24061594	VR, 200 ohm, 1/8W
R253	24061594	VR, 200 ohm, 1/8W
R255	24066940	VR, 5k ohm, 1/10W
R256	24063750	VR, 10k ohm, 0.08W
R257	24063754	VR, 50k ohm, 0.08W
R261	24360102	CF, 1k ohm, 1/8W
R262	24366102	CF, 1k ohm
R263	24366473	CF, 47k ohm
R264	24366473	CF, 47k ohm
R265	24366821	CF, 820 ohm
R266	24366750	CF, 75 ohm
R267	24366910	CF, 91 ohm
R268	24366431	CF, 430 ohm
R269	24366472	CF, 4700 ohm
R270	24366223	CF, 22k ohm
R271	24366103	CF, 10k ohm
R272	24366332	CF, 3300 ohm
R273	24366102	CF, 1k ohm
R274	24366152	CF, 1500 ohm
R275	24366102	CF, 1k ohm
R277	24366273	CF, 27k ohm

Location No.	Part No.	Description
R278	24366683	CF, 68k ohm
R279	24366202	CF, 2k ohm
R280	24366272	CF, 2700 ohm
R283	24360563	CF, 56k ohm, 1/8W
R290	24366101	CF, 100 ohm
R301	24366751	CF, 750 ohm
R302	24366564	CF, 560k ohm
R303	24945225	CC, 2.2M ohm, ±10%, 1/4W
R304	24366103	CF, 10k ohm
R306	24366182	CF, 1800 ohm
R308	24366393	CF, 39k ohm
R309	24360244	CF, 240k ohm, 1/8W
R310	24946825	CC, 8.2M ohm, ±10%, 1/2W
R312	24366563	CF, 56k ohm
R313	24366113	CF, 11k ohm
R314	24366433	CF, 43k ohm
R315	24366362	CF, 3600 ohm
R316	24366333	CF, 33k ohm
R317	24383431	OMF, 430 ohm, 2W
R318	24383431	OMF, 430 ohm, 2W
R319	24552511	OMF, 511 ohm, 1/2W
R320	24360102	CF, 1k ohm, 1/8W
R321	24552202	OMF, 2k ohm, 1/2W
R322	24552102	OMF, 1k ohm, 1/2W
R323	24323109	OMF, 1 ohm, 2W
R324	24366113	CF, 11k ohm
R325	24384100	OMF, 100 ohm, 3W
R326	24360103	CF, 10k ohm, 1/8W
R327	24546399	FR, 3.9 ohm, 1/2W
R329	24552102	OMF, 1k ohm, 1/2W
R330	24321129	OMF, 1.2 ohm, 1/2W
R331	24366563	CF, 56k ohm
R332	24553112	OMF, 1100 ohm, 1W
R333	24360331	CF, 330 ohm, 1/8W
R334	24553752	OMF, 7500 ohm, 1W
R335	24552101	OMF, 100 ohm, 1/2W
R341	24366102	CF, 1k ohm
R351	24063746	VR, 200k ohm, 0.08W
R352	24066937	VR, 50k ohm, 1/10W
R381	24366302	CF, 3k ohm
R382	24366103	CF, 10k ohm
R383	24366133	CF, 13k ohm
R384	24366302	CF, 3k ohm
R385	24366512	CF, 5100 ohm
R401	24366751	CF, 750 ohm
R402	24366103	CF, 10k ohm
R403	24360362	CF, 3600 ohm, 1/8W
R404	24366362	CF, 3600 ohm
R405	24366363	CF, 36k ohm
R406	24378154	CF, 150k ohm, ±2%, 1/8W
R407	24552181	OMF, 180 ohm, 1/2W
R408	24553822	OMF, 8200 ohm, 2W

Location No.	Part No.	Description
R409	24384682	OMF, 6800 ohm, 3W
R410	24000947	OMF, 15k ohm, ±2%, 1/2W
R411	24552330	OMF, 33 ohm, 1/2W
R412	24553102	OMF, 1k ohm, 1W
R413	24366132	CF, 1300 ohm
R415	24383472	OMF, 4700 ohm, 2W
R416	24383512	OMF, 5100 ohm, 2W
R417	24383512	OMF, 5100 ohm, 2W
R418	24946272	CC, 2700 ohm, ±10%, 1/2W
R419	24553113	OMF, 11k ohm, 1W
R421	24366472	CF, 4700 ohm
R422	24366562	CF, 5600 ohm
R423	24552432	OMF, 4300 ohm, 1/2W
R424	24366682	CF, 6800 ohm
R425	24552221	OMF, 220 ohm, 1/2W
R426	24382390	OMF, 390 ohm, 1W
R440	24366103	CF, 10k ohm
R441	24366103	CF, 10k ohm
R444	24322828	OMF, 0.82 ohm, 2W
R448	24548369	FR, 3.6 ohm, 2W
R451	24066952	VR, 10k ohm, 1/10W
R452	24066940	VR, 5k ohm, 1/10W
R501	24360821	CF, 820 ohm, 1/8W
R502	24360242	CF, 2400 ohm, 1/8W
R504	24366334	CF, 330k ohm
R505	24360103	CF, 10k ohm, 1/8W
R506	24366162	CF, 1600 ohm
R507	24366511	CF, 510 ohm
R509	24366241	CF, 240 ohm
R510	24360302	CF, 3k ohm, 1/8W
R512	24360104	CF, 100k ohm, 1/8W
R513	24366153	CF, 15k ohm
R514	24366511	CF, 510 ohm
R515	24366821	CF, 820 ohm
R516	24366201	CF, 200 ohm
R517	24366823	CF, 82k ohm
R518	24367333	CF, 33k ohm, ±2%
R519	24367333	CF, 33k ohm, ±2%
R520	24360223	CF, 22k ohm, 1/8W
R526	24366471	CF, 470 ohm
R530	24366621	CF, 620 ohm
R531	24366621	CF, 620 ohm
R533	24383393	OMF, 39k ohm, 2W
R534	24383393	OMF, 39k ohm, 2W
R535	24383393	OMF, 39k ohm, 2W
R540	24366181	CF, 180 ohm
R541	24366161	CF, 160 ohm
R542	24366181	CF, 180 ohm
R543	24366221	CF, 220 ohm
R544	24366221	CF, 220 ohm
R545	24360221	CF, 220 ohm, 1/8W
R551	24066955	VR, 1k ohm, 1/10W

Location No.	Part No.	Description
R555	24063750	VR, 10k ohm, 0.08W
R556	24063750	VR, 10k ohm, 0.08W
R557	24061589	VR, 10k ohm, 1/8W
R558	24061589	VR, 10k ohm, 1/8W
R559	24061589	VR, 10k ohm, 1/8W
R591	24383153	OMF, 15k ohm, 2W
R592	24383153	OMF, 15k ohm, 2W
R593	24383153	OMF, 15k ohm, 2W
R601	24366102	CF, 1k ohm
R602	24366102	CF, 1k ohm
R603	24366273	CF, 27k ohm
R604	24366104	CF, 100k ohm
R605	24366302	CF, 3k ohm
R606	24366102	CF, 1k ohm
R607	24366102	CF, 1k ohm
R610	24366122	CF, 1200 ohm
R611	24360122	CF, 1200 ohm, 1/8W
R612	24360122	CF, 1200 ohm, 1/8W
R613	24366102	CF, 1k ohm
R614	24366122	CF, 1200 ohm
R615	24366154	CF, 150k ohm
R616	24366154	CF, 150k ohm
R617	24366122	CF, 1200 ohm
R618	24360331	CF, 330 ohm, 1/8W
R619	24366331	CF, 330 ohm
R620	24366472	CF, 4700 ohm
R621	24321479	MF, 4.7 ohm, 1/2W
R622	24366273	CF, 27k ohm
R623	24321479	MF, 4.7 oh, 1/2W
R624	24366273	CF, 27k ohm
R625	24366392	CF, 3900 ohm
R626	24366472	CF, 4700 ohm
R627	24366562	CF, 5600 ohm
R628	24360103	CF, 10k ohm, 1/8W
R629	24366562	CF, 5600 ohm
R630	24366472	CF, 5600 ohm
R631	24366103	CF, 10k ohm
R632	24366472	CF, 4700 ohm
R633	24366392	CF, 3900 ohm
R634	24366102	CF, 1k ohm
R635	24321398	MF, 0.38 ohm, 1/2W
R636(UA01)	24360122	CF, 1200 ohm, 1/8W
R636(U903)	24366333	CF, 33k ohm
R637	24366333	CF, 33k ohm
R638	24366103	CF, 10k ohm
R639	24366104	CF, 100k ohm
R640	24366152	CF, 1500 ohm
R652	24063750	VR, 10k ohm, 0.08W
R653	24063750	VR, 10k ohm, 0.08W
R665	24946331	CC, 330 ohm, ±10%, 1/2W
R666	24946331	CF, 330 ohm, ±10%, 1/2W
R667	24360103	CF, 10k ohm, 1/8W

Location No.	Part No.	Description
R668	24360103	CF, 10k ohm, 1/8W
R671	24366333	CF, 33k ohm
R672	24366123	CF, 12k ohm
R673	24366181	CF, 180 ohm
R674	24366102	CF, 1k ohm
R675	24366222	CF, 2200 ohm
R676	24366152	CF, 1500 ohm
R677	24366682	CF, 6800 ohm
R678	24366562	CF, 5600 ohm
R679	24366102	CF, 1k ohm
R680	24366152	CF, 1500 ohm
R681	24553121	OMF, 120 ohm, 1/2W
R682	24366102	CF, 1k ohm
R683	24366203	CF, 20k ohm
R684	24366182	CF, 1800 ohm
R685	24366203	CF, 20k ohm
R686	24366102	CF, 1k ohm
R687	24366122	CF, 1200 ohm
R688	24366221	CF, 220 ohm
R689	24366102	CF, 1k ohm
R690	24366221	CF, 220 ohm
R695	24366471	CF, 470 ohm
R696	24366562	CF, 5600 ohm
R697	24366102	CF, 1k ohm
R802	24007938	Cement, 180 ohm, 15W
R803	24965563	OMF, 56k ohm, 3W
R804	24552362	OMF, 3600 ohm, 1/2W
R805	24007771	Cement, 10 ohm, 10W
R806	24366361	CF, 360 ohm
R807	24366100	CF, 10 ohm
R808	24321478	MF, 0.47 ohm, 1/2W
R809	24360361	CF, 360 ohm, 1/8W
R810	24360304	CF, 300k ohm, 1/8W
R811	24378334	CF, 330k ohm, ±2%, 1/8W
R812	24553202	OMF, 2k ohm, 1W
R813	24366393	CF, 39k ohm
R814	24366561	CF, 560 ohm, ±2%
R815	24366622	CF, 6200 ohm
R816	24366112	CF, 1100 ohm
R817	24003987	MF, 1k ohm, ±2%, 1/4W
R818	24327202	MF, 2k ohm, ±1%, 1/4W
R819	24552470	MF, 47 ohm, 1/2W
R820	24531220	FR, 22 ohm, 1/2W
R821	24322228	MF, 0.22 ohm, 1W
R822	24322228	MF, 0.22 ohm, 1W
R823	24366100	CF, 10 ohm
R824	24366472	CF, 4700 ohm
R825	24360102	CF, 1k ohm, 1/8W
R826	24360304	CF, 300k ohm, 1/8W
R827	24531222	FR, 2200 ohm, 1/2W
R828	24382114	OMF, 110k ohm, 1W
R829	24378334	CF, 330k ohm, ±2%, 1/8W

Location No.	Part No.	Description
R831	24007664	Cement, 5.6 ohm, 20W
R831	or 24007665	Cement, 5.6 ohm, 20W
R832	24007664	Cement, 5.6 ohm, 20W
R832	or 24007665	Cement, 5.6 ohm, 20W
R833	24382513	OMF, 51k ohm, 1W
R834	24382473	OMF, 47k ohm, 1W
R835	24360153	CF, 15k ohm, 1/8W
R836	24360242	CF, 2400 ohm, 1/8W
R837	24360560	CF, 56 ohm, 1/8W
R838	24360102	CF, 1k ohm, 1/8W
R839	24382123	OMF, 12k ohm, 1W
R840	24382123	OMF, 12k ohm, 1W
R841	24360431	CF, 430 ohm, 1/8W
R842	24360331	CF, 330 ohm, 1/8W
R843	24942101	CC, 100 ohm, 1/2W
R844	24382683	OMF, 68k ohm, 1W
R850	24066926	VR, 10k ohm, 1/10W
R851	24066930	VR, 500 ohm, 1/10W
R861	24383361	OMF, 360 ohm, 2W
R862	24383361	OMF, 360 ohm, 2W
R863	24322518	MF, 0.51 ohm, 1W
R864	24322518	MF, 0.51 ohm, 1W
⚠ R890	24000875	PTC Thermistor, 18 ohm, 290V
R901	24946152	CF, 1500 ohm, ±10%, 1/2W
R902	24946152	CF, 1500 ohm, ±10%, 1/2W
R903	24946152	CF, 1500 ohm, ±10%, 1/2W
R920	24000880	FR, 5.1 ohm, 2W
RA01	24366103	CF, 10k ohm
RA02	24366223	CF, 22k ohm
RA03	24366223	CF, 22k ohm
RA04	24366103	CF, 10k ohm
RA05	24366103	CF, 10k ohm
RA06	24366102	CF, 1k ohm
RA07	24366105	CF, 1M ohm
RA08	24366243	CF, 24k ohm
RA09	24366753	CF, 75k ohm
RA11	24366563	CF, 56k ohm
RA12	24366563	CF, 56k ohm
RA13	24366434	CF, 430k ohm
RA14	24366224	CF, 220k ohm
RA15	24366224	CF, 220k ohm
RA16	24366224	CF, 220k ohm
RA17	24366224	CF, 220k ohm
RA18	24366103	CF, 10k ohm
RA20	24366562	CF, 5600 ohm
RA21	24366102	CF, 1k ohm
RA22	24366102	CF, 1k ohm
RA23	24366102	CF, 1k ohm
RA24	24366102	CF, 1k ohm
RA25	24366102	CF, 1k ohm
RA27	24366563	CF, 56k ohm
RA28	24366563	CF, 56k ohm

Location No.	Part No.	Description
RA29	24366563	CF, 56k ohm
RA30	24366104	CF, 100k ohm
RA31	24366104	CF, 100k ohm
RA32	24366104	CF, 100k ohm
RA33	24366102	CF, 1k ohm
RA34	24366102	CF, 1k ohm
RA35	24360102	CF, 1k ohm, 1/8W
RA36	24366223	CF, 22k ohm
RA37	24366103	CF, 10k ohm
RA38	24366432	CF, 4300 ohm
RA39	24366103	CF, 10k ohm
RA40	24366223	CF, 22k ohm
RA41	24360103	CF, 10k ohm, 1/8W
RA43	24366223	CF, 22k ohm
RA44	24366223	CF, 22k ohm
RA45	24360102	CF, 1k ohm, 1/8W
RA46	24366203	CF, 20k ohm
RA47	24366333	CF, 33k ohm
RA48	24366333	CF, 33k ohm
RA49	24366333	CF, 33k ohm
RA51	24366563	CF, 56k ohm
RA52	24366104	CF, 100k ohm
RA53	24366153	CF, 15k ohm
RA54	24366222	CF, 2200 ohm
RA55	24366103	CF, 10k ohm
RA56	24366392	CF, 3900 ohm
RA57	24366124	CF, 120k ohm
RA60	24366153	CF, 15k ohm
RA61	24366222	CF, 2200 ohm
RA62	24366222	CF, 2200 ohm
RA63	24366222	CF, 2200 ohm
RA64	24366104	CF, 100k ohm
RA65	24366363	CF, 36k ohm
RA66	24360471	CF, 470 ohm, 1/8W
RA67	24366201	CF, 200 ohm
RA68	24945335	CC, 3.3M, ±10%, 1/4W
RA80	24366394	CF, 390k ohm
RA83	24366182	CF, 1800 ohm
RA84	24366123	CF, 12k ohm
RA85	24366123	CF, 12k ohm
RA86	24366473	CF, 47k ohm
RA87	24366472	CF, 4700 ohm
RA88	24366563	CF, 56k ohm
RA89	24366473	CF, 47k ohm
RA90	24366182	CF, 1800 ohm
RA91	24366223	CF, 22k ohm
RA97	24383103	OMF, 10k ohm, 2W
RB03	24360333	CF, 33k ohm, 1/8W
RB04	24366103	CF, 10k ohm
RB05	24360103	CF, 10k ohm, 1/8W
RB06	24366302	CF, 3k ohm
RB07	24360103	CF, 10k ohm, 1/8W

Location No.	Part No.	Description
RB08	24366302	CF, 3k ohm
RB09	24360102	CF, 1k ohm, 1/8W
RB20	24366101	CF, 100 ohm
RB21	24366681	CF, 680 ohm
RB22	24366103	CF, 10k ohm
RB23	24366681	CF, 680 ohm
RB25	24366103	CF, 10k ohm
RB26	24366302	CF, 3k ohm
RB27	24366103	CF, 10k ohm
RB28	24366392	CF, 3900 ohm
RB29	24366221	CF, 220 ohm
RB30	24366102	CF, 1k ohm
RB40	24366221	CF, 220 ohm
RB41	24366101	CF, 100 ohm
RB43	24366301	CF, 300 ohm
RE02	24942913	CC, 91k ohm, 1/2W
RE03	24942913	CC, 91k ohm, 1/2W
RE04	24366223	CF, 22k ohm
RE05	24366103	CF, 10k ohm
RE06	24366222	CF, 2200 ohm
RE07	24366562	CF, 5600 ohm
RE08	24552331	OMF, 330 ohm, 1/2W
RE09	24553222	OMF, 2200 ohm, 1W
RE10	24552331	OMF, 330 ohm, 1/2W
RE11	24366102	CF, 1k ohm
RG24	24941102	CC, 1k ohm, 1/4W
RG31	24366473	CF, 47k ohm
RG32	24366512	CF, 5100 ohm
RG33	24366302	CF, 3k ohm
RG34	24366104	CF, 100k ohm
RG35	24366393	CF, 39k ohm
RG36	24366103	CF, 10k ohm
RG37	24366472	CF, 4700 ohm
RG38	24366183	CF, 18k ohm
RG39	24366332	CF, 3300 ohm
RG40	24366102	CF, 1k ohm
RG41	24366102	CF, 1k ohm
RG42	24360392	CF, 3900 ohm, 1/8W
RG43	24366333	CF, 33k ohm
RG44	24366333	CF, 33k ohm
RG45	24366103	CF, 10k ohm
RG46	24366104	CF, 100k ohm
RG47	24366222	CF, 2200 ohm
RG48	24366104	CF, 100k ohm
RM02	24366221	CF, 220 ohm
RM03	24366333	CF, 33k ohm
RM04	24366102	CF, 1k ohm
RM05	24366102	CF, 1k ohm
RM08	24360103	CF, 10k ohm, 1/8W
RM11	24366332	CF, 3300 ohm
RM12	24366151	CF, 1500 ohm
RM13	24366332	CF, 3300 ohm

Location No.	Part No.	Description
RM14	24366151	CF, 150 ohm
RM15	24366332	CF, 3300 ohm
RM16	24366151	CF, 150 ohm
RM18	24366122	CF, 1200 ohm
RM20	24366104	CF, 100k ohm
RM21	24366473	CF, 47k ohm
RM22	24366152	CF, 1500 ohm
RM23	24366182	CF, 1800 ohm
RM24	24366332	CF, 3300 ohm
RM25	24366681	CF, 680 ohm
RM26	24366681	CF, 680 ohm
RM27	24366152	CF, 1500 ohm
RM28	24366182	CF, 1800 ohm
RM29	24366332	CF, 3300 ohm
RM30	24366681	CF, 680 ohm
RM32	24546569	FR, 5.6 ohm, 1/2W
RM34	24366681	CF, 680 ohm
RM35	24366272	CF, 2700 ohm
RM36	24366563	CF, 56k ohm
RM40	24360392	CF, 3900 ohm, 1/8W
RM44	24366104	CF, 100k ohm
RM45	24366103	CF, 10k ohm
RM65	24366273	CF, 27k ohm
RM66	24366103	CF, 10k ohm
RM68	24366103	CF, 10k ohm
RM70	24366681	CF, 680 ohm
RM73	24366393	CF, 39k ohm
RM74	24366681	CF, 680 ohm
RM75	24366222	CF, 2200 ohm
RM76	24366103	CF, 10k ohm
RM77	24366222	CF, 2200 ohm
RM78	24366101	CF, 100 ohm
RM79	24366101	CF, 100 ohm
RM80	24366103	CF, 10k ohm
RM81	24366332	CF, 3300 ohm
RM82	24366472	CF, 4700 ohm
RM83	24366472	CF, 4700 ohm
RN01	24366223	CF, 22k ohm
RN02	24366331	CF, 330 ohm
RN03	24366562	CF, 5600 ohm
RN05	24366562	CF, 5600 ohm
RN06	24366153	CF, 15k ohm
RN07	24366152	CF, 1500 ohm
RN08	24366331	CF, 330 ohm
RN09	24366562	CF, 5600 ohm
RN12	24360203	CF, 20k ohm, 1/8W
RN18	24366103	CF, 10k ohm
RN19	24366152	CF, 1500 ohm
RN20	24366103	CF, 10k ohm
RN21	24366472	CF, 4700 ohm
RN22	24366102	CF, 1k ohm
RN23	24366222	CF, 2200 ohm

Location No.	Part No.	Description
RN46	24366244	CF, 240k ohm
RN47	24941684	CC, 680k ohm, 1/4W
RN61	24366562	CF, 5600 ohm
RN62	24366562	CF, 5600 ohm
RN63	24366201	CF, 200 ohm
RN66	24366562	CF, 5600 ohm
RN71	24366302	CF, 3k ohm
RN72	24366562	CF, 5600 ohm
RN73	24366562	CF, 5600 ohm
RN74	24360221	CF, 220 ohm, 1/8W
RN75	24360153	CF, 15k ohm, 1/8W
RN87	24360223	CF, 22k ohm, 1/8W
RN88	24366273	CF, 27k ohm
RN89	24366273	CF, 27k ohm
RR01	24360223	CF, 22k ohm, 1/8W
RR02	24380220	CF, 22 ohm, 1/8W
RR03	24380222	CF, 2200 ohm, 1/8W
RR04	24552470	MF, 47 ohm, 1/2W
RR07	24380562	CF, 5600 ohm, 1/8W
RS01	24366223	CF, 22k ohm
RS02	24366223	CF, 22 ohm
RS03	24366102	CF, 1k ohm
RS04	24366223	CF, 22k ohm
RS05	24366223	CF, 22k ohm
RS06	24366223	CF, 22k ohm
RS07	24366473	CF, 47k ohm
RS08	24366622	CF, 6200 ohm
RS09	24366124	CF, 120k ohm
RS10	24366473	CF, 47k ohm
RS11	24366622	CF, 6200 ohm
RS12	24360102	CF, 1k ohm, 1/8W
RS13	24366102	CF, 1k ohm
RS22	24366562	CF, 5600 ohm
RS23	24366273	CF, 27k ohm
RS24	24366183	CF, 18k ohm
RS26	24366103	CF, 10k ohm
RS27	24360393	CF, 10k ohm, 1/8W
RS28	24366183	CF, 18k ohm
RS29	24366183	CF, 18k ohm
RS30	24366562	CF, 5600 ohm
RS31	24366103	CF, 10k ohm
RS32	24366822	CF, 8200 ohm
RS34	24366183	CF, 18k ohm
RS35	24366823	CF, 82k ohm
RS38	24366103	CF, 10k ohm
RS39	24366103	CF, 10k ohm
RS40	24366104	CF, 100k ohm
RS41	24366563	CF, 56k ohm
RS44	24366823	CF, 82k ohm
RS45	24366223	CF, 22k ohm
RS46	24366103	CF, 10k ohm
RS49	24366562	CF, 5600 ohm

Location No.	Part No.	Description
RS60	24360332	CF, 3300 ohm, 1/8W
RS63	24366103	CF, 10k ohm
RS64	24366103	CF, 10k ohm
RS67	24366562	CF, 5600 ohm
RS68	24360562	CF, 5600 ohm, 1/8W
RS69	24366393	CF, 39k ohm
RS70	24366393	CF, 39k ohm
RS71	24366103	CF, 10k ohm
RS75	24366393	CF, 39k ohm
RX01	24366470	CF, 47 ohm
RX02	24366470	CF, 47 ohm
RX03	24367102	CF, 1k ohm, ±2%
RX04	24366103	CF, 10k ohm
RX06	24366101	CF, 100 ohm
RX07	24366473	CF, 47k ohm
RX08	24366473	CF, 47k ohm
RX09	24366103	CF, 10k ohm
RX10	24366473	CF, 47k ohm
RX11	24366103	CF, 10k ohm
RX12	24366183	CF, 18k ohm
RX13	24366221	CF, 220 ohm
RX16	24366152	CF, 1500 ohm
RX17	24366561	CF, 560 ohm
RX18	24366821	CF, 820 ohm
RX19	24366391	CF, 390 ohm
RX20	24366121	CF, 120 ohm
RX21	24366562	CF, 5600 ohm
RX22	24366153	CF, 15k ohm
RX24	24366102	CF, 1k ohm
RX25	24366222	CF, 2200 ohm
RX26	24366471	CF, 470 ohm
RX27	24366561	CF, 560 ohm
RX46	24366121	CF, 120 ohm

COILS & TRANSFORMERS

Location No.	Part No.	Description
L102	23262856	Coil, PIF, TRF1452
L105	23238928	Coil, Peaking, TRF4339AC
L106	23261051	Coil, RF Choke, AZ9246E
L151	23262881	Coil, AFT, TRF1445
L152	23262881	Coil, AFT, TRF1445
L161	23262951	Coil, RF Choke, TRF1019
L162	23261985	Coil, RF Choke, TRF9221
L201	23238923	Coil, Peaking, TRF4829AC
L301	23221999	Coil, RF Choke, TRF9209
L407	23238934	Coil, Peaking, TRF4109AC
L410	23221026	Coil, RF Choke, AZ9004Y
L441	23222693	Coil, Horiz. Linearity, TLN2027
L442	23222691	Coil, Width, TLN2031
⚠ L462	23227517	Deflection Yoke, TDY6280B
L501	23238916	Coil, Peaking, TRF4330AC
L502	23237988	Coil, Peaking, TRF4829AC
L503	23238944	Coil, Peaking, TRF4201AC
L551	23250945	Coil, 1H-Delay Matching, TRF5425
L552	23250943	Coil, IF Coil, TRF5426
L601	23238921	Coil, Peaking, TRF4120AC
L651	23252198	Coil, SIF, TRF6702G
L671	23238922	Coil, Peaking, TRF4100AC
L672	23232983	Transformer, SIF Converter, TRF3030
L801	23221050	Coil, RF Choke, TLN1015
L802	23261975	Coil, Choke, TRF9229
L803	23222694	Coil, Width, TLN2026
L805	23261975	Coil, Choke, TRF9229
L806	23103981	Coil (Ferrite Bead), RH0630025
L807	23261975	Coil, Choke, TRF9229
L808	23222694	Coil, Width, TLN2026
⚠ L901	23200808	Coil, Degaussing, TSB2206
LA01	23237999	Coil, Peaking, TRF4109AC
LA02	23237999	Coil, Peaking, TRF4109AC
LB01	23237978	Coil, Peaking, TRF4560AC
LM51	23252933	Coil, Bell Chroma, TRF5424
LM52	23252934	Coil, Demod Ident, TRF5423
LM53	23252934	Coil, Demod Ident, TRF5423
LM54	23252934	Coil, Demod Ident, TRF5423
LM56	23237894	Coil, Peaking, TRF4472AE
LN03	23238920	Coil, Peaking, TRF4150AC
LR01	23232963	Coil, TRF3055
LR02	23232963	Coil, TRF3055
LX02	23237980	Coil, Peaking, TRF4390AC
LX03	23237978	Coil, Peaking, TRF4560AC
⚠ T401	23224980	Transformer, Horiz. Drive, TLN1044
⚠ T461	23236013	Transformer, Flyback, TFB5013AD
T801	23211962	Transformer, TRF3117
⚠ T802	23213767	Transformer, Converter, TPW3057
⚠ T803	23213798	Transformer, TPW1292
TN01	23262910	Coil, PIF Trap, TRF1427
TN02	23262843	Coil, PIF Trap, TRF1457

SEMICONDUCTORS

Location No.	Part No.	Description
IC101	B0356804	IC, TA7680AP
IC211	B0358000	IC, TA7750P
IC501	B0357050	IC, TA7699AP
IC601	B0356190	IC, TA7630P
IC602	23119763	IC, AN7158N
ICA01	23119382	IC,TMP47C432N-8897
ICA02	B0428420	IC, TMM842P
ICA03	B0349250	IC, TA75393S
ICA30	23115878	IC, µPC574JC
ICB01	23119450	IC, PD6105C

Location No.	Part No.	Description
ICM01	23119543	IC, T51397AP
ICR01	23119566	IC, μPC147HA
ICS01	B0474370	IC, TC40174BP
ICS11	23119448	IC, AN5560
ICX01	23119371	IC, TDA4560
ICX02	B0470662	IC, TC4066BP
Q161	A6708871	Transistor, 2SC388ATM
Q201	A6317547	Transistor, 2SC1815-Y
Q202	A6509121	Transistor, 2SA562TM-O
Q203	A6317547	Transistor, 2SC1815-Y
Q204	A6534045	Transistor, 2SA1015-Y
Q205	A6534045	Transistor, 2SA1015-Y
Q206	A6534045	Transistor, 2SA1015-Y
Q207	A6317547	Transistor, 2SC1815-Y
Q208	A6317547	Transistor, 2SC1815-Y
Q212	A6534045	Transistor, 2SA1015-Y
Q213	A6534045	Transistor, 2SA1015-Y
Q214	A6317547	Transistor, 2SC1815-Y
Q215	23114454	Transistor, DTC144ES
Q215	or A6002040	Transistor, RN1204
Q217	A6317547	Transistor, 2SC1815-Y
Q303	A6319576	Transistor, 2SC2073 FA-4
Q306	A6358055	Transistor, 2SC3182N FA-1
Q307	A6546025	Transistor, 2SA1265N FA-1
Q371	A6317547	Transistor, 2SC1815-Y
Q372	A6317547	Transistor, 2SC1815-Y
Q402	A678971D	Transistor, 2SC1569 FA-5
⚠ Q404	A6848103	Transistor, 2SD871
Q405	A6317547	Transistor, 2SC1815-Y
Q405	or A6317547	Transistor, 2SC1815-GR
Q406	A6842185	Transistor, 2SD553-Y
Q505	A6319400	Transistor, 2SC2068
Q506	A6330000	Transistor, 2SC2482
Q507	A6319400	Transistor, 2SC2068
Q508	A6330000	Transistor, 2SC2482
Q509	A6319400	Transistor, 2SC2068
Q510	A6330000	Transistor, 2SC2482
Q603	A6317547	Transistor, 2SC1815-Y
Q604	A6317547	Transistor, 2SC1815-Y
Q605	A671656A	Transistor, 2SC495-Y
Q606	A6534045	Transistor, 2SA1015-Y
Q671	A6317547	Transistor, 2SC1815-Y
Q672	A6317547	Transistor, 2SC1815-Y
Q673	A6319302	Transistor, 2SC1959-Y
Q674	A6317547	Transistor, 2SC1815-Y
Q675	A6317547	Transistor, 2SC1815-Y
⚠ Q801	A6865553	Transistor, 2SD1279
Q802	A6533725	Transistor, 2SA1012-O
Q802	or A6533730	Transistor, 2SA1012-Y
Q803	A6319283	Transistor, 2SC1959-O
Q804	A6534045	Transistor, 2SA1015-Y
⚠ Q805	A7800720	SCR, SFOR1B41

Location No.	Part No.	Description
Q806	A6546025	Transistor, 2SA1265N FA-1
Q807	A6325020	Transistor, 2SC2230-GR
Q830	A6317547	Transistor, 2SC1815-Y
⚠ Q835	A7804500	SCR, SF5J42
QA04	A6534045	Transistor, 2SA1015-Y
QA05	A6534045	Transistor, 2SA1015-Y
QA06	A6534045	Transistor, 2SA1015-Y
QA07	A6048371	Transistor, 2SK30ATM-GR
QA08	A6317547	Transistor, 2SC1815-Y
QA09	A6534045	Transistor, 2SA1015-Y
QA10	A6534045	Transistor, 2SA1015-Y
QA13	A6734592	Transistor, 2SC752GTM-Y
QA14	A6734592	Transistor, 2SC752GTM-Y
QA15	A6534045	Transistor, 2SA1015-Y
QA16	A6534045	Transistor, 2SA1015-Y
QB05	A6317547	Transistor, 2SC1815-Y
QB06	A6317547	Transistor, 2SC1815-Y
QB10	A6317567	Transistor, 2SC1815-GR
QB11	A6534063	Transistor, 2SA1015-GR
QB12	A6317567	Transistor, 2SC1815-GR
QB20	A6317567	Transistor, 2SC1815-GR
QE01	A6317547	Transistor, 2SC1815-Y
QE02	A6317547	Transistor, 2SC1815-Y
QE03	A6333310	Transistor, 2SC2655-O
QE03	or A6333320	Transistor, 2SC2655-Y
QE04	A6532320	Transistor, 2SA940
QE05	A6317547	Transistor, 2SC1815-Y
QE06	A6314446	Transistor, 2SC1627-Y
QE07	A6534045	Transistor, 2SA1015-Y
QG05	A6317547	Transistor, 2SC1815-Y
QG06	A6317547	Transistor, 2SC1815-Y
QG07	A6317547	Transistor, 2SC1815-Y
QG08	A6317547	Transistor, 2SC1815-Y
QG09	A6317547	Transistor, 2SC1815-Y
QM08	A6317547	Transistor, 2SC1815-Y
QM11	A6317547	Transistor, 2SC1815-Y
QM12	A6534045	Transistor, 2SA1015-Y
QM13	A6317547	Transistor, 2SC1815-Y
QN03	A6317547	Transistor, 2SC1815-Y
QN05	A6317567	Transistor, 2SC1815-GR
QN06	A6534045	Transistor, 2SA1015-Y
QN13	A6002040	Transistor, RN1204
QN13	or 23114454	Transistor, DTC144ES
QN16	A6002040	Transistor, RN1204
QN16	or 23114454	Transistor, DTC144ES
QN20	A6317547	Transistor, 2SC1815-Y
QS02	A6317547	Transistor, 2SC1815-Y
QS03	A6317547	Transistor, 2SC1815-Y
QS03	or A6317567	Transistor, 2SC1815-GR
QS04	A6317581	Transistor, 2SC1815-BL
QS04	or A6317567	Transistor, 2SC1815-GR
QS05	A6534045	Transistor, 2SA1015-Y

Location No.	Part No.	Description
QS06	A6317547	Transistor, 2SC1815-Y
QS07	A6534045	Transistor, 2SA1015-Y
QS12	A6317547	Transistor, 2SC1815-Y
QS13	A6317547	Transistor, 2SC1815-Y
QS14	A6317547	Transistor, 2SC1815-Y
QS16	A6317547	Transistor, 2SC1815-Y
QS17	A6317547	Transistor, 2SC1815-Y
QS18	A6317547	Transistor, 2SC1815-Y
QS19	A6002030	Transistor, RN1203
QS19	or 23114455	Transistor, DTC124ES
QS20	A6002030	Transistor, RN1203
QS20	or 23114455	Transistor, DTC124ES
QS21	A6317547	Transistor, 2SC1815-Y
QS22	A6002030	Transistor, RN1203
QS22	or 23114455	Transistor, DTC124ES
QS23	A6534045	Transistor, 2SA1015-Y
QS24	A6317547	Transistor, 2SC1815-Y
QS25	A6002030	Transistor, RN1203
QS25	or 23114455	Transistor, DTC124ES
QS26	A6002030	Transistor, RN1203
QS26	or 23114455	Transistor, DTC124ES
QS27	A6002030	Transistor, RN1203
QS27	or 23114455	Transistor, DTC124ES
QX03	A6317547	Transistor, 2SC1815-Y
QX04	A6317547	Transistor, 2SC1815-Y
QX05	A6317547	Transistor, 2SC1815-Y
QX06	A6002040	Transistor, RN1204
QX06	or 23114454	Transistor, DTC144ES
QX07	A6534045	Transistor, 2SA1015-Y
QX08	A6317547	Transistor, 2SC1815-Y
QX09	A6534045	Transistor, 2SA1015-Y
QX10	A6317547	Transistor, 2SC1815-Y
QX12	A6002040	Transistor, RN1204
QX12	or 23114454	Transistor, DTC144ES
D202	A7150258	Diode, 1SS176
D203	A7150258	Diode, 1SS176
D204	A7150258	Diode, 1SS176
D205	A7150258	Diode, 1SS176
D206	23115535	Diode, OA91
D207	A7246711	Diode, 1S1555 (TV)
D240	A7150041	Diode, 1SS104
D241	A7150258	Diode, 1SS176
D242	A7150258	Diode, 1SS176
D260	A7150258	Diode, 1SS176
D261	A7150258	Diode, 1SS176
D301	A7150258	Diode, 1SS176
D302	23115690	Diode, GU-3C
D303	A7246711	Diode, 1S1555 (TV)
D304	A7246711	Diode, 1S1555 (TV)
D305	A7568475	Diode, TVR-2D
D306	A7568487	Diode, TVR-2G
D307	A7568615	Diode, 1S1886

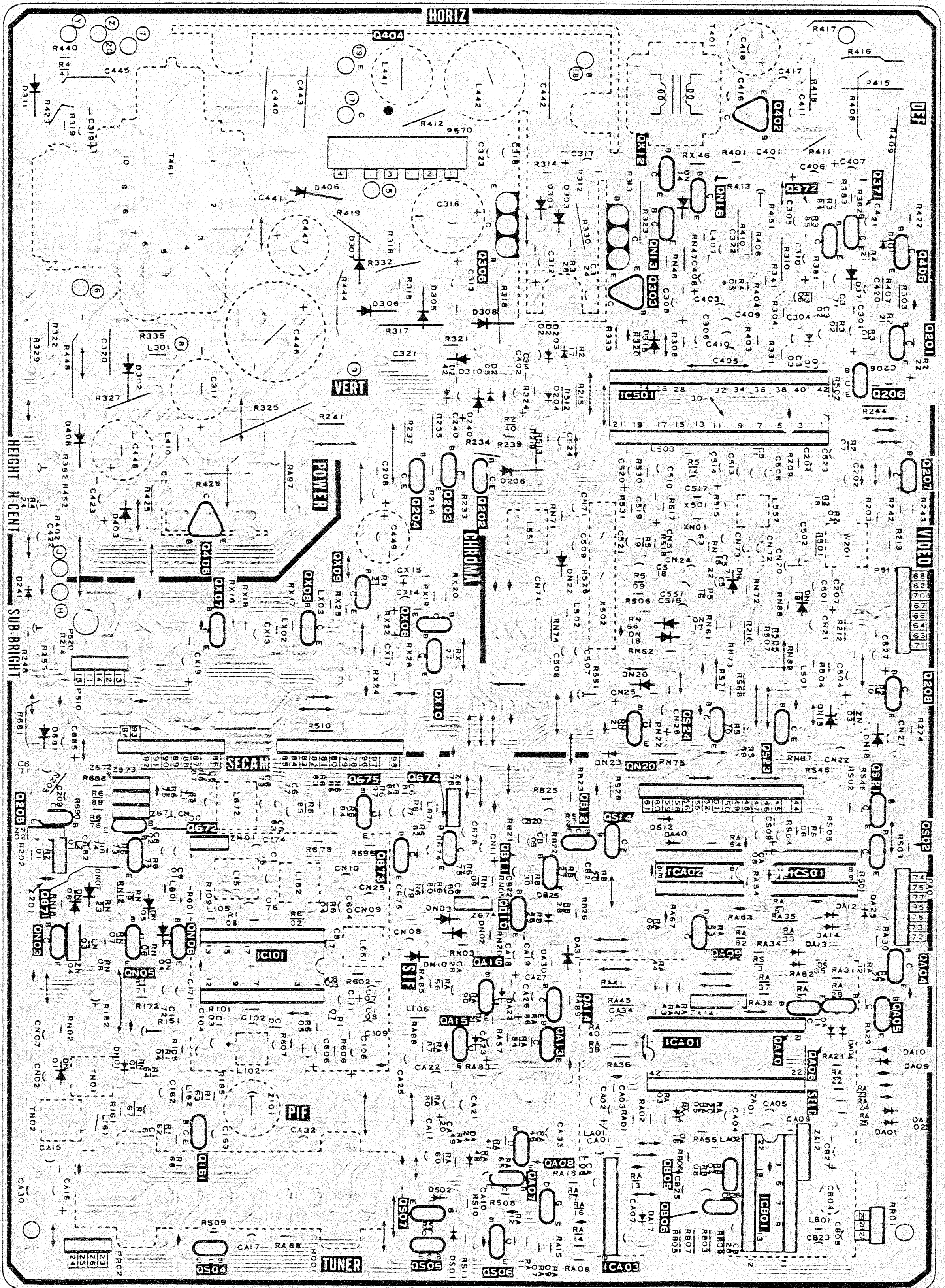
Location No.	Part No.	Description
D308	A7572200	Diode, 1S1942
D310	A7110411	Diode, Zener, 05Z12Y
D311	A7568615	Diode, 1S1886
D315	A7110160	Diode, Zener, 05Z7.5Y
D371	A7110017	Diode, Zener, 05Z5.6Y
D401	A7150258	Diode, 1SS176
D403	A7110412	Diode, Zener, 05Z12Z
D406	A7978850	Diode, S5295G
D408	A7568300	Diode, 1S1835
D591	A7150258	Diode, 1SS176
D592	A7150258	Diode, 1SS176
D593	A7150258	Diode, 1SS176
D610	A7246711	Diode, 1S1555 (TV)
D612	A7110462	Diode, Zener, 05Z13Y
D613	A7150258	Diode, 1SS176
D614	A7150258	Diode, 1SS176
D615	A7150258	Diode, 1SS176
D616	A7150258	Diode, 1SS176
D681	A7110208	Diode, Zener, 05Z8.2Y
D804	A7978855	Diode, S5295J
D805	A7978855	Diode, S5295J
D806	23115690	Diode, GU-3C
D807	A7568300	Diode, 1S1835
D808	A7568300	Diode, 1S1835
D809	A7568300	Diode, 1S1835
D810	A7568300	Diode, 1S1835
D811	A7978850	Diode, S5295G
D812	A7246711	Diode, 1S1555 (TV)
D813	A7246711	Diode, 1S1555 (TV)
⚠ D814	A7110160	Diode, Zener, 05Z7.5Y
D815	A7580660	Diode, 3JH61
D816	23115586	Diode, GU3SY
D817	A7580660	Diode, 3JH61
D818	A7568300	Diode, 1S1835
D820	A7246602	Diode, 1S1553 (TV)
D822	A7110075	Diode, Zener, 05Z6.2X
D822	or A7110076	Diode, Zener, 05Z6.2Y
D822	or A7110077	Diode, Zener, 05Z6.2Y
⚠ D831	A7568410	Diode, TVR-4J
⚠ D832	A7568410	Diode, TVR-4J
⚠ D833	A7568410	Diode, TVR-4J
⚠ D834	A7568410	Diode, TVR-4J
D836	A7568410	Diode, TVR-4J
D837	A7568410	Diode, TVR-4J
D839	A7110663	Diode, Zener, 05Z24X
D861	23115586	Diode, GU3SY
DA01	A7150258	Diode, 1SS176
DA02	A7150258	Diode, 1SS176
DA04	A7150258	Diode, 1SS176
DA09	A7150258	Diode, 1SS176
DA10	A7150258	Diode, 1SS176
DA11	A7150258	Diode, 1SS176

Location No.	Part No.	Description
DA12	A7150258	Diode, 1SS176
DA13	A7150258	Diode, 1SS176
DA14	A7150258	Diode, 1SS176
DA16	A7150258	Diode, 1SS176
DA17	A7150258	Diode, 1SS176
DA21	A7150258	Diode, 1SS176
DA22	A7150258	Diode, 1SS176
DA24	A7150258	Diode, 1SS176
DA25	A7150258	Diode, 1SS176
DA31	37246711	Diode, 1S1555 (TV)
DA40	A7150258	Diode, 1SS176
DA55	A8616160	Diode (LED), TLOG116, Green
DB25	A7150258	Diode, 1SS176
DB44	A7150258	Diode, 1SS176
⚠ DE01	23115571	Photo-Coupler, PC-510
DE02	A7246711	Diode, 1S1555 (TV)
DE03	A7568615	Diode, 1S1886
DE04	A7568615	Diode, 1S1886
DE05	A7568615	Diode, 1S1886
DE06	A7568615	Diode, 1S1886
DE07	A7110041	Diode, Zener, 05Z5.1Y
DE08	A7110208	Diode, Zener, 05Z8.2Y
DE55	A8600606	Diode (LED), TLR113AD
DG55	A8605702	Diode (LED), TLG114A, Green
DM01	A7150258	Diode, 1SS176
DM02	A7246711	Diode, 1S1555 (TV)
DM03	A7246711	Diode, 1S1555 (TV)
DM05	A7110411	Diode, Zener, 05Z12Y
DM06	A7150258	Diode, 1SS176
DM07	A7150258	Diode, 1SS176
DM08	A7150258	Diode, 1SS176
DM09	A7150258	Diode, 1SS176
DM10	A7150258	Diode, 1SS176
DM11	A7150258	Diode, 1SS176
DM12	A7150258	Diode, 1SS176
DM21	A7150258	Diode, 1SS176
DN01	A7288601	Diode, 1S2186 FA-1
DN02	A7288601	Diode, 1S2186 FA-1
DN03	A7288601	Diode, 1S2186 FA-1
DN04	A7288601	Diode, 1S2186 FA-1
DN05	A7288601	Diode, 1S2186 FA-1
DN06	A7288601	Diode, 1S2186 FA-1
DN07	A7288601	Diode, 1S2186 FA-1
DN10	A7288601	Diode, 1S2186 FA-1
DN14	A7288601	Diode, 1S2186 FA-1
DN15	A7288601	Diode, 1S2186 FA-1
DN16	A7288601	Diode, 1S2186 FA-1
DN17	A7288601	Diode, 1S2186 FA-1
DN18	A7288601	Diode, 1S2186 FA-1
DN19	A7288601	Diode, 1S2186 FA-1
DN20	A7110016	Diode, Zener, 05Z5.6X
DN21	A7150258	Diode, 1SS176

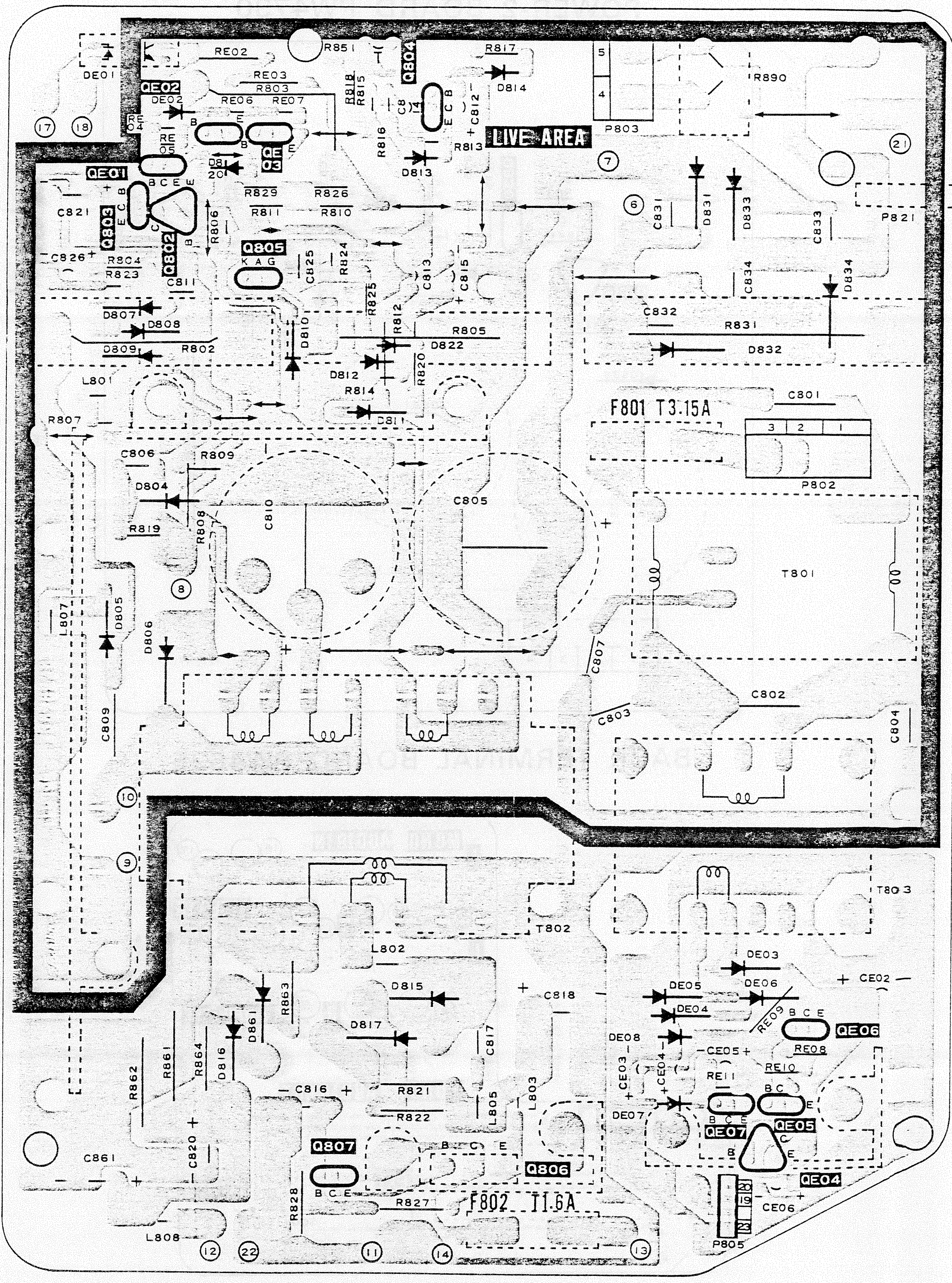
Location No.	Part No.	Description
DN22	A7288601	Diode, 1S2186 FA-1
DN23	A7150258	Diode, 1SS176
DN71	A7288601	Diode, 1S2186 FA-1
DR01	A8652035	Diode, Photo, TPS703
DS01	A7150258	Diode, 1SS176
DS02	A7150258	Diode, 1SS176
DS03	A7246711	Diode, 1S1555 (TV)
DS04	A7246711	Diode, 1S1555 (TV)
DS05	A7150258	Diode, 1SS176
DS12	A7150258	Diode, 1SS176
DS14	A7150258	Diode, 1SS176
DS15	A7150258	Diode, 1SS176
DS16	A7150258	Diode, 1SS176
DS17	A7150258	Diode, 1SS176
DS18	A7150258	Diode, 1SS176
DS55	A8616160	Diode (LED), TLOG116, Green
MISCELLANEOUS		
E503	23848889	Wedge, Yoke Holding (3 required)
E907	23198853	CRT Earth Lead
⚠ F801	23144959	Fuse, T3.15A
F801A	23165102	Fuse Holder
⚠ F802	23144970	Fuse, T1.6A
F802A	23165102	Fuse Holder
L462A	23199318	Compensator, DY, TC-C
L462B	23199314	Compensator, DY, TC-E
L462C	23199482	Compensator, DY, TC-B
⚠ P001	23142601	Aerial Terminal Board, AT909S
P661	23166180	HEADPHONE Jack
P801	23176797	Power Cord
S001	23145644	Switch, SPEAKER
S201	23145563	Switch, SYSTEM
S202	23145571	Switch, MSS
⚠ S801	23145583	Switch, POWER
SA01	23145563	Switch, VIDEO
SA02	23145563	Switch, MFT UP
SA03	23145563	Switch, MFT DOWN
SA04	23145563	Switch, VOL. UP
SA05	23145563	Switch, VOL. DOWN
SA06	23145563	Switch, POS. UP
SA07	23145563	Switch, POS. DOWN
SA08	23145563	Switch, SEARCH
SA09	23145563	Switch, MEMORY
⚠ V901A	23901880	Socket, Picture Tube, 8P
V901M	23102989	Magnet, Purity-Convergence, MAG-1006
W201	23250951	Coil, Delay Line, TRF2048
W661	23151391	Speaker, SPK1133, 50 x 120 mm, 8 ohm
W662	23151391	Speaker, SPK1133, 50 x 120 mm, 8 ohm

Location No.	Part No.	Description
X501	23153979	Crystal, 4.43MHz
X502	23153907	1H-Delay Line, A31H MDL
XN01	23153961	Crystal, 3.58MHz
Z101	A5611320	PSF, F1057
Z201	23107911	Ceramic Video, Trap, 5.5~6MHZ, TCF1019
Z671	23107947	Ceramic Filter, SIF, SFE5.5MBF
Z672	23107948	Ceramic Filter, SFE6.0MBF
Z673	23107949	Ceramic Filter, SFE6.5MBF
Z674	23107948	Ceramic Filter, SFE6.0MBF
Z675	23107897	Ceramic Video Trap, ICF1023
ZA01	23153949	Ceramic Resonator, 4MHz, TCR1003
ZA12	24094834	Capacitor Block, 220pF x 4, 50V
ZA13	24094742	Capacitor Block, 1000pF x 4, 50V
ZN01	23107980	Ceramic Filter, SFE4.5MB
ZN02	23107913	Ceramic Video Trap, 6.5MHz, TCF1018
ZN03	23252876	Coil, ARC Trap, TRF2026
ZN04	23107976	Ceramic Video Trap, TRS4.5MC2
PC BOARD ASSEMBLIES		
U001	23169595	BACK TERMINAL Unit, PW4625
U501A	23169425	SECAM CHROMA Unit, PW4628-1
U501B	23169424	SYSTEM SW. Unit, PW4628-2
U801	23169423	POWER-2 Unit, PW4730
U902	23169600	MAIN Unit, PW4620
U903A	23169428	POWER Unit, PW4621-1
U903B	23169427	A/V SOUND Unit, PW4621-2
U903C	23169426	CRT DRIVE Unit, PW4621-3
UA01A	23169279	CONTROL Unit, PW4624-1
UA01B	23169278	HEADPHONE Unit, PW4624-2
PICTURE TUBE		
⚠ V901	35433139	Picture Tube, A66JLH70X(W)
TUNER		
H001	23121776	Tuner, VHF/UHF, EG522FX1
H001	or 23121794	Tuner, VHF/UHF, EG522F

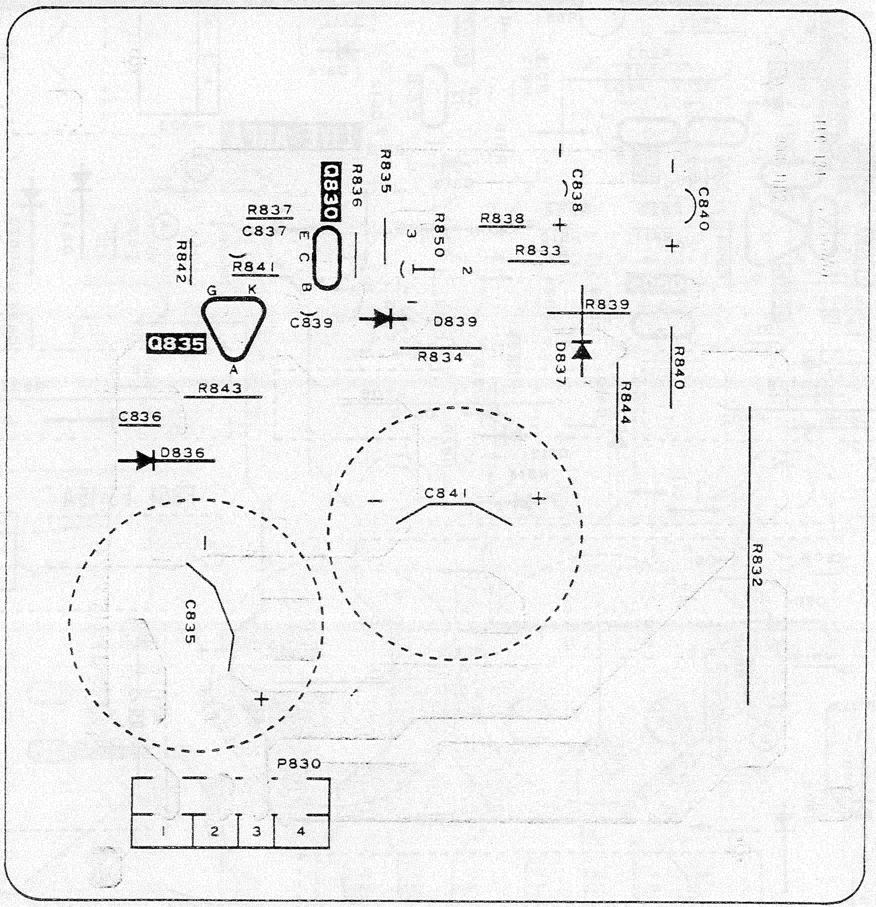
MAIN BOARD PW4620


HORIZ
DEF
VERT
POWER
CHROMA
VIDEO
HEIGHT
H-CENT
SUB-BRIGHT
SECAM
PIF
SIF
TUNER
IC501
ICA01
ICA02
ICA03
ICS01
IC101
ICB01

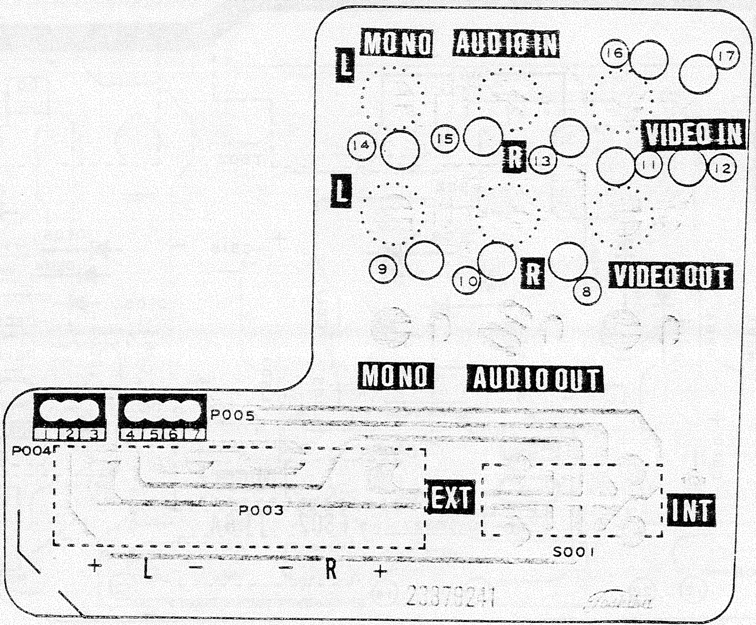
POWER BOARD PW4621-1


DE01
RE02
R851
Q804
R817
D814
R890
P803
QE02
RE03
R803
DE02
RE06
RE07
R818
R815
C814
C812
LIVE AREA
RE04
RE05
R816
R813
D813
QE03
D820
QE01
C821
Q803
Q802
R829
R811
R826
R810
R806
Q805
K A G
C826
R804
R823
C811
C825
R824
R825
C813
C815
D807
D808
D809
R802
D810
R812
R805
D822
D812
R820
R814
D811
L801
R807
C806
R809
D804
R819
R808
C810
C805
L807
D805
D806
C809
C831
D831
D833
C833
P821
C834
D834
C832
R831
D832
F801 T3.15A
C801
P802
T801
C807
C802
C803
C804
T802
T803
L802
D815
C818
D863
D861
D817
C817
R862
R861
R864
D816
C816
R821
R822
L805
L803
C820
C861
Q807
Q806
R828
R827
F802 T1.6A
L808
DE03
DE05
DE06
CE02
DE04
RE09
QE06
DE08
CE05
RE08
CE03
CE04
RE11
RE10
DE07
QE07
QE05
QE04
CE06
P805
B C E
⑥
⑦
⑧
⑨
⑩
⑪
⑫
⑬
⑭
⑰
⑱
㉑
㉒

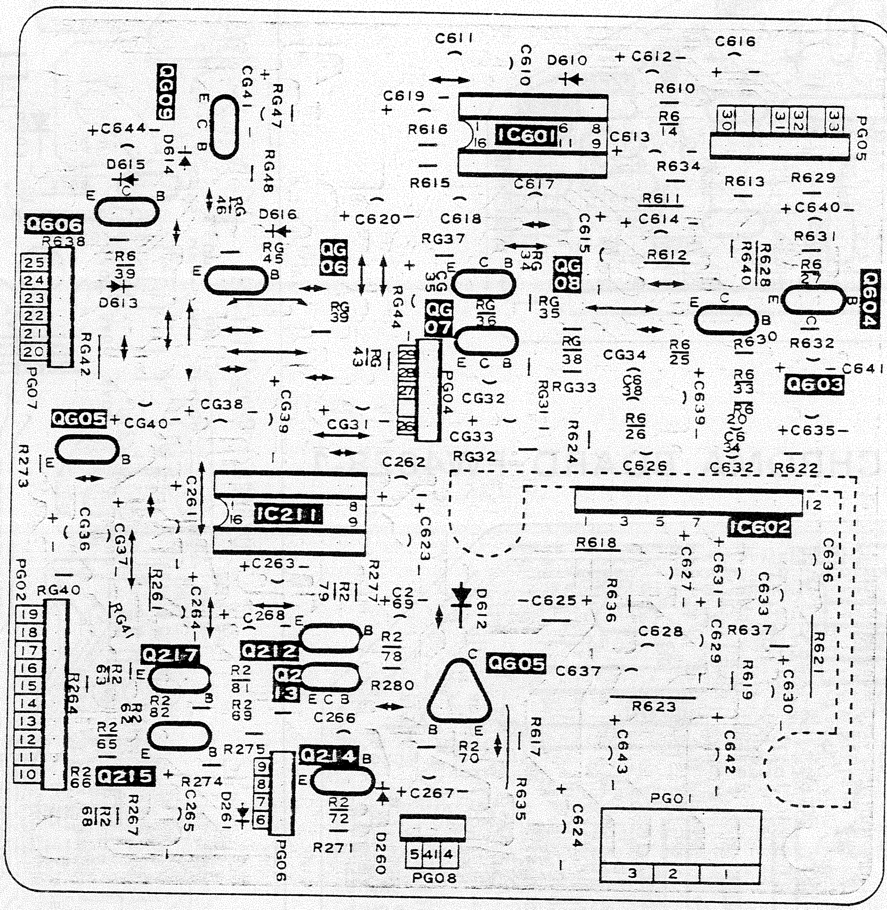
POWER-2 BOARD PW4730


R835
R836
Q830
R837
C837
R842
R841
G
K
E
C
B
Q835
A
C839
D839
R834
R850
3
2
R838
R833
C838
C840
R839
D837
R840
R844
R843
C836
D836
C841
C835
R832
P830
1
2
3
4

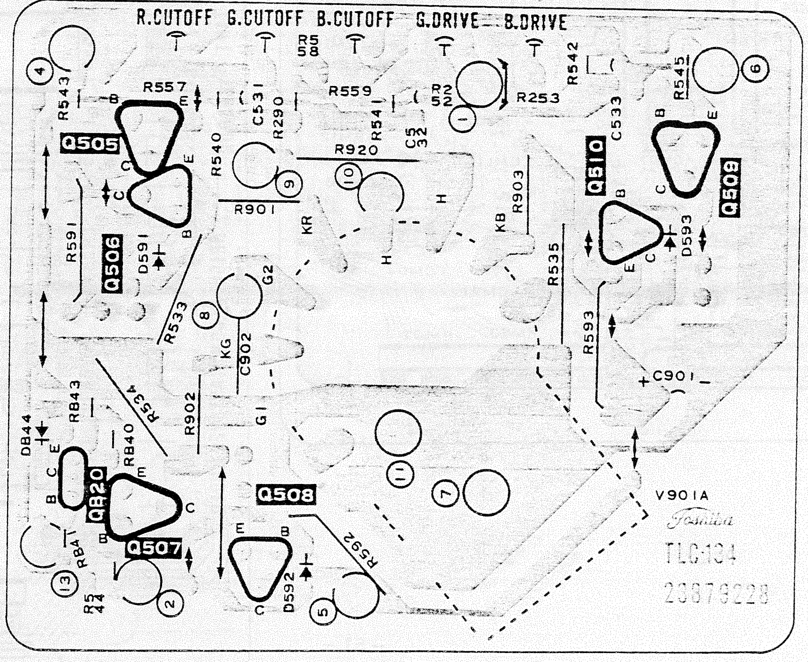
BACK TERMINAL BOARD PW4625


MONO
AUDIO IN
L
16
17
14
15
R
13
VIDEO IN
11
12
L
9
10
R
8
VIDEO OUT
MONO
AUDIO OUT
P005
P004
1 2 3
4 5 6 7
P003
EXT
INT
S001
+ L − − R +
23879241

A/V SOUND BOARD PW4621-2

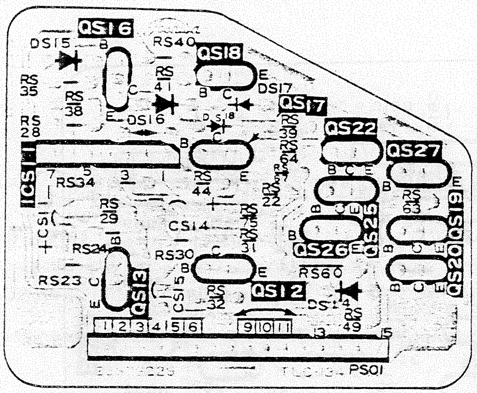

C611
C610
D610
C612
C616
R610
C619
R616
IC601
C613
R614
PG05
30
31
32
33
Q609
CG41
RG47
C644
D614
RG48
D615
Q606
R638
RG46
D616
C620
C618
R615
C617
R634
R613
R629
R611
C614
C640
R631
RG37
QG06
QG08
QG07
RG45
R639
D613
RG39
RG44
RG34
RG35
RG36
RG38
R612
R640
R628
R630
R632
Q604
C641
Q603
CG34
CG38
R625
R633
C639
R620
C634
C635
RG42
PG07
25
24
23
22
21
20
RG43
PG04
CG32
RG33
RG31
CG33
RG32
R624
R626
C626
C632
R622
QG05
CG40
CG38
CG39
CG31
R273
C262
C261
IC211
C623
IC602
R618
C636
CG36
CG37
RG40
PG02
C263
R261
C264
R276
R279
R277
C269
D612
C625
R636
C627
C631
C633
C628
R637
C629
R621
RG41
C268
Q217
Q212
Q213
R278
R280
Q605
C637
R619
C630
R264
R263
R281
R282
R269
C266
R623
R262
R265
R266
Q215
R275
R274
C265
Q214
R270
R617
C643
C642
19
18
17
16
15
14
13
12
11
10
R267
R268
D261
PG06
R272
C267
R271
D260
5
4
4
PG08
R635
C624
PG01
3
2
1

CRT DRIVE BOARD PW4621-3.

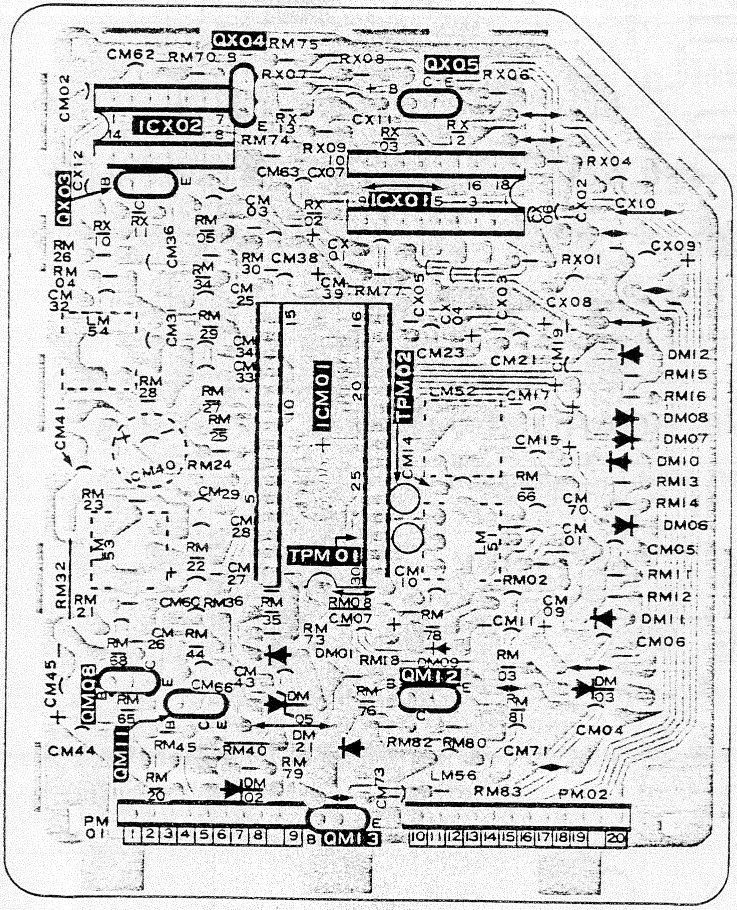

R.CUTOFF
G.CUTOFF
B.CUTOFF
G.DRIVE
B.DRIVE
R558
R542
④
⑥
R543
R557
C531
R290
R559
R541
C532
R252
R253
R545
C533
Q505
R540
R920
①
Q510
Q509
⑨
⑩
R901
KR
H
KB
R903
R591
Q506
D591
D593
G2
R535
⑧
R533
KG
C902
R593
C901
R843
R534
R902
G1
D844
R840
E
C
B
Q820
⑪
⑦
Q508
Q507
R841
R592
D592
⑬
②
⑤
R544
V901A
Toshiba
TLC-134
23879228

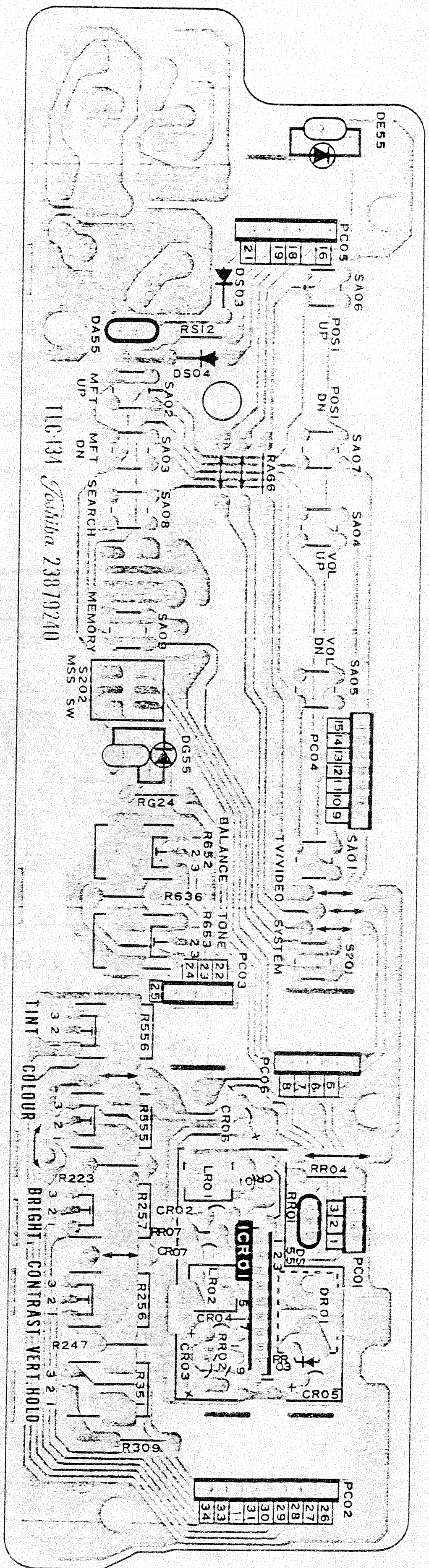
CONTROL BOARD PW4624-1

SYS. SW. BOARD PW4628-2


QS16
QS18
QS17
QS22
QS27
QS25
QS19
QS26
QS20
QS12
QS13
ICS11
DS15
DS16
DS17
RS40
RS35
RS28
RS34
RS29
RS24
RS23
RS30
RS44
RS22
RS63
RS60
RS32
RS49
CS14
CS11
CS15
PS01
TLC-134

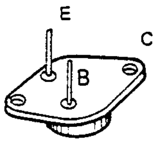
SECAM CHROMA BOARD PW4628-1


QX04
QX05
QX03
ICX02
ICX01
ICM01
TPM02
TPM01
QM12
QM08
QM11
QM13
CM62
RM70
RM75
RX07
RX08
RX06
CM02
CX11
RX13
RX03
RX12
RM74
RX09
RX04
CM63
CX07
CX10
CX09
RX01
CX08
CM38
RM77
CM23
CM21
CM19
DM12
RM15
RM16
DM08
DM07
DM10
RM13
RM14
DM06
CM05
RM11
RM12
DM11
CM06
CM15
CM17
LM52
CM41
CM40
RM24
CM29
CM45
CM44
RM45
RM40
RM82
RM80
CM71
CM04
LM56
RM83
PM02
PM01
DM01
RM18
DM09
RM02
CM07
CM11

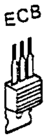

DE55
PC05
SA06
DS03
POSI UP
POSI DN
RS12
DA55
DS04
MFT UP
MFT DN
SA02
SA03
SA07
RAG6
SEARCH
SA08
SA04
VOL UP
VOL DN
MEMORY
SA09
SA05
S202
MSS SW
PC04
DG55
RG24
R652
BALANCE
TV/VIDEO
SA01
R636
R653
TONE
SYSTEM
S201
PC03
TINT
R556
COLOUR
PC06
R555
CR06
LR01
CR01
RR04
R223
BRIGHT
R257
CR02
RR07
CR07
ICR01
RR01
PC01
CONTRAST
R256
LR02
CR04
DR01
R247
RR02
CR03
VERT. HOLD
R351
CR05
R309
PC02
TLC-134
Toshiba 23879240

TERMINAL VIEW OF TRANSISTOR, etc.

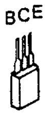
① 2SD871
2SD1279



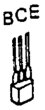
② 2SA940



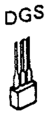
③ 2SC2482
2SC752GTM
2SC2230
2SC2655



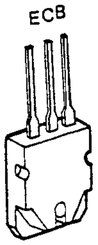
④ 2SA1015
2SC388ATM
2SC1815
2SA562TM
2SC1959
2SC1627



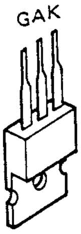
⑤ 2SK30ATM



⑥ 2SC1265N
2SC3182N

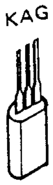


⑦ SF5J42



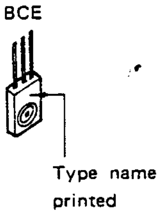
(SCR)

⑧ SFOR1B41



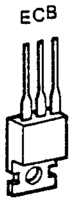
(SCR)

⑨ 2SC495

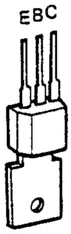


Type name printed

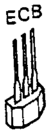
⑩ 2SD553
2SC1569
2SC2073
2SA1012



⑪ 2SC2068



⑫ RN1203
RN1204



SCHEMATIC DIAGRAM < MODEL 289X4M >

NOTE: The parts identified by shading and ⚠ mark are critical for safety. Replace only with part number specified.

OBSERVATION OF VOLTAGES AND WAVEFORMS

1. Voltages read with VTVM from point shown to chssis ground, line voltage 220 volts, colour bar signal.
2. Voltages reading may vary ±20%.
3. The schematic shown is representative only.
4. All waveforms are taken using a wide band oscilloscope and a low capacity probe.
5. Check FINE TUNING, AGC, BRIGHTNESS, CONTRAST and COLOUR controls for best picture, make sure that CONTRAST and COLOUR controls are in mid position and BRIGHTNESS control is almost in maximum position.
6. Waveforms are taken using a standard colour bar signal.
7. Voltage readings in (   ) are measured with the SECAM colour bar signal received.

NOTES:

1. D.C. resistnace value of a principal transformer is shown in this schematic diagram. These are measured for separated from the circuit.
2. The circuits are subject to change without notice.
3. ⊖ : Solder links.

EXPRESSION

VALUE OF RESISTOR, CAPACITOR and INDUCTOR

1. Resistance is shown in ohm, k=1,000, M=100,000.
2. Unless other wise noted in schematic, all capacitor values less than 1 are expressed in mfd and the values more than 1 in pF.
3. Unless otherwise noted in schematic, all inductor values more than 1 are expressed in μH, and the values less than 1 in H.

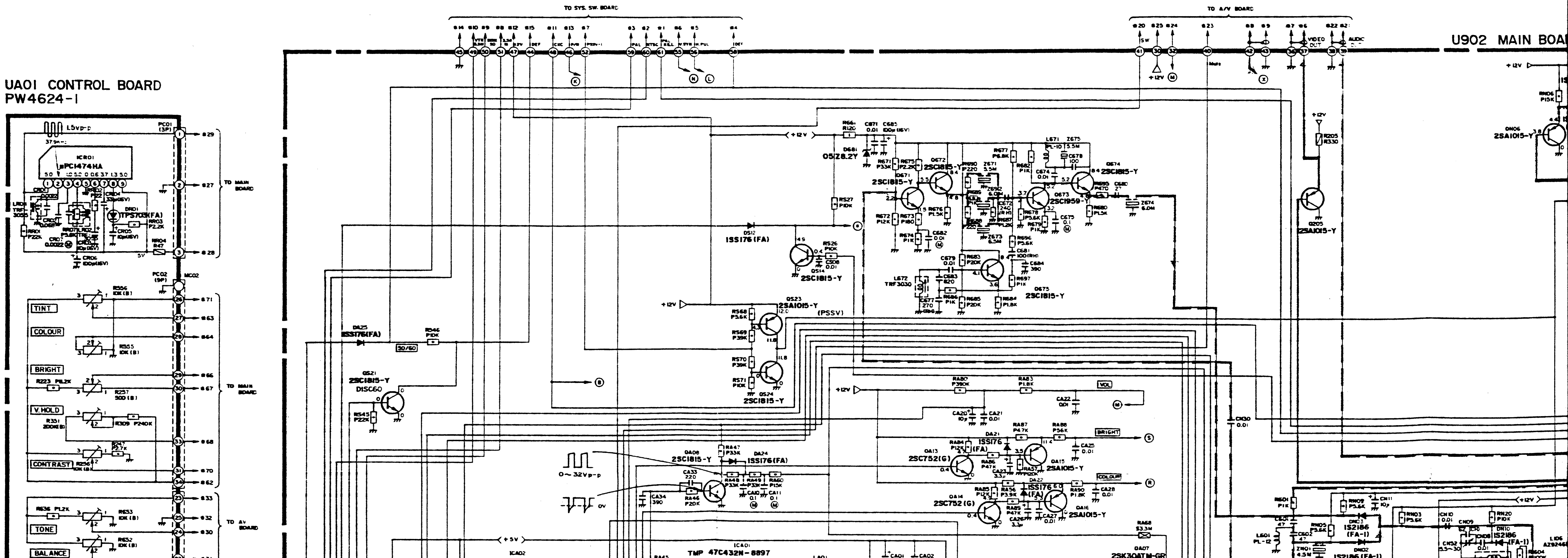
RESISTOR

Table 1

Type	Mark
Carbon Composition	S
Oxide Metal Film	R
Insulated Carbon Film	P
Wire Wound	W
Cement	No Mark
Variable Resistor	⏛
Positive Thermistor	⏛
Negative Thermistor	⊠
Fusible Resistor	FR

Table 2

Watt	Mark	Watt
1/16 W	⊡⊡	3
1/8 W 1/6 W	⊡	5
1/4 W	⊠	10
1/2 W	▧	15
1 W	1	20
2 W	2	25


UA01 CONTROL BOARD
PW4624-1
TO SYS. SW. BOARD
TO A/V BOARD
U902 MAIN BOARD
IC R01
μPC1474HA
TINT
COLOUR
BRIGHT
V. HOLD
CONTRAST
TONE
BALANCE
TO MAIN BOARD
TO AV BOARD
2SC1815-Y
2SA1015-Y
2SC1959-Y
2SC752(G)
1SS176(FA)
05Z8.2Y
DISC60
TMP 47C432N-8897
2SK30ATM-GR
1S2186
VOL
BRIGHT
COLOUR
+12V
+5V
0~32Vp-p
0V

NOTES:

1. D.C. resistnace value of a principal transformer is shown in this schematic diagram. These are measured for separated from the circuit.
2. The circuits are subject to change without notice.
3. ⊖ : Solder links.

EXPRESSION

VALUE OF RESISTOR, CAPACITOR and INDUCTOR

1. Resistance is shown in ohm, k=1,000, M=100,000.
2. Unless other wise noted in schematic, all capacitor values less than 1 are expressed in mfd and the values more than 1 in pF.
3. Unless otherwise noted in schematic, all inductor values more than 1 are expressed in μH, and the values less than 1 in H.

RESISTOR

Table 1

Type	Mark
Carbon Composition	S
Oxide Metal Film	R
Insulated Carbon Film	P
Wire Wound	W
Cement	No Mark
Variable Resistor	-▭-
Positive Thermistor	-▭-
Negative Thermistor	-▭-
Fusible Resistor	FR

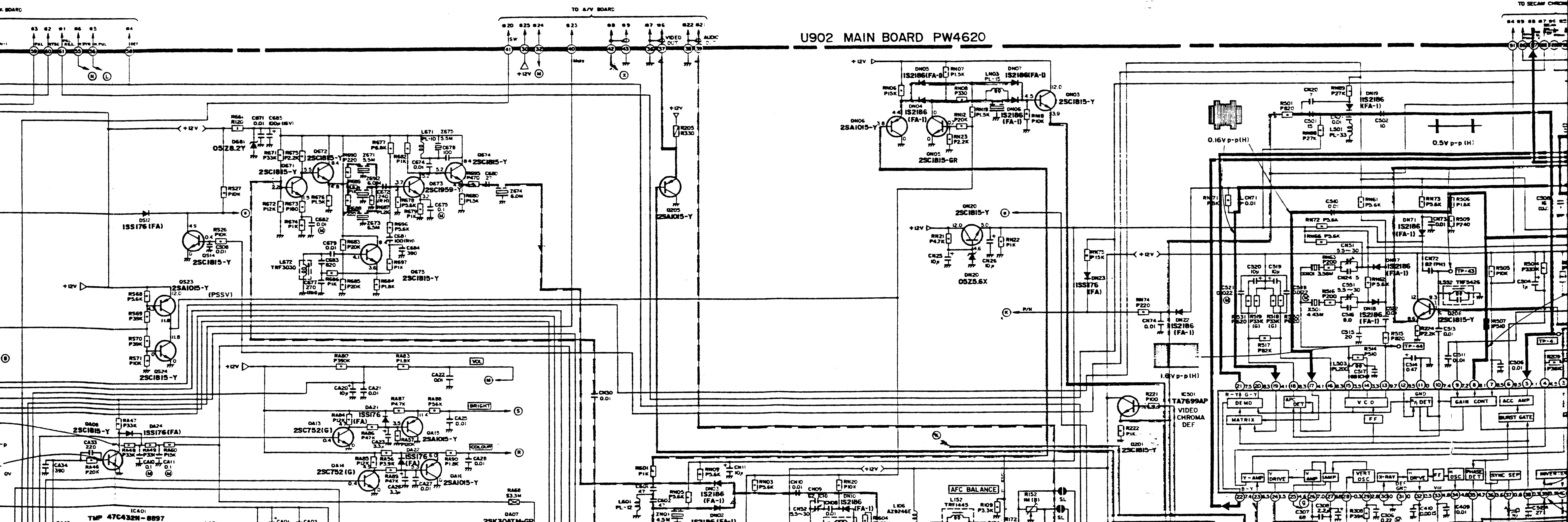
Table 2

Watt	Mark	Watt	Mark
1/16 W	-[··]-	3 W	-[3]-
1/8 W 1/6 W	-[·]-	5 W	-[5]-
1/4 W	-[⊠]-	10 W	-[10]-
1/2 W	-[/]-	15 W	-[15]-
1 W	-[1]-	20 W	-[20]-
2 W	-[2]-	25 W	-[25]-

CAPACITOR

Table 3

Type	Mark
Ceramic Disc 50V Only	⊣⊢
Electrolitic	⊣⊢
Electrolitic Non-Polar	⊣⊢
Variable Capacitor	⊣⊢
Other	⊣⊢

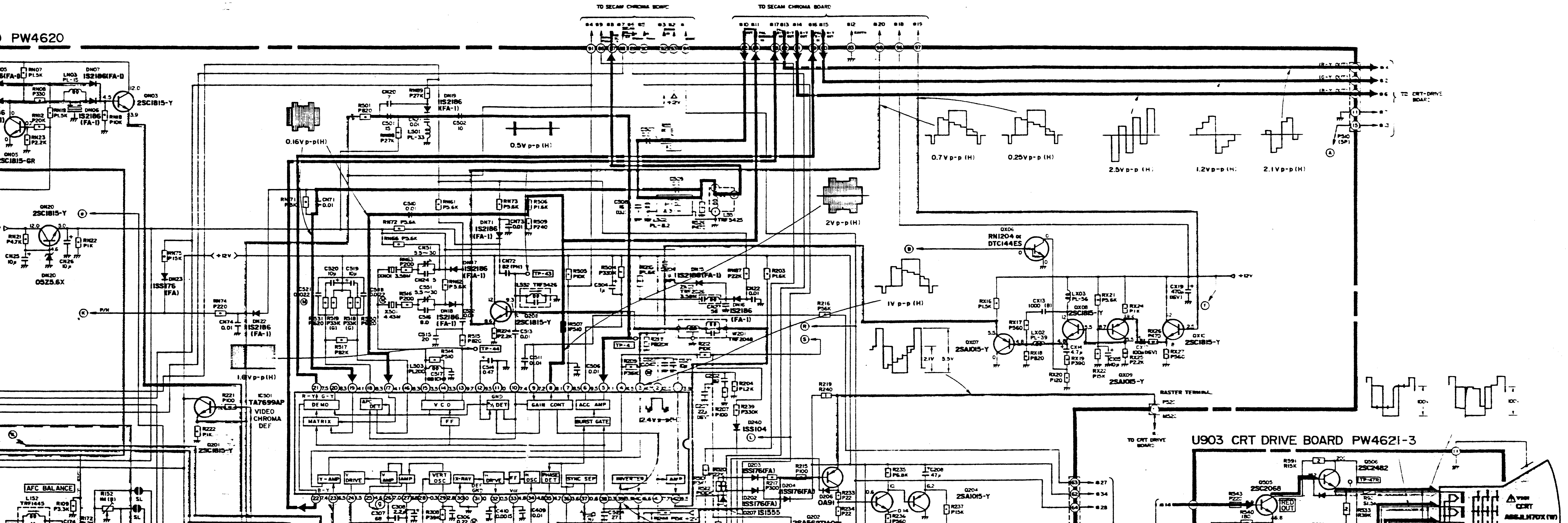

U902 MAIN BOARD PW4620
TO A/V BOARD
TO SECAM CHROMA
2SC1815-Y
2SA1015-Y
2SC1959-Y
2SC752(G)
2SC1815-GR
1SS176(FA)
1S2186(FA-1)
05Z8.2Y
05Z5.6X
+12V
0.16V p-p(H)
0.5V p-p (H)
1.6V p-p(H)
IC501 TA7699AP VIDEO CHROMA DEF
VOL
BRIGHT
COLOUR
AFC BALANCE
IC401 TMP 47C432N-8897
(PSSV)
DEMO
MATRIX
APC DET
VCO
FF
DET
GAIN CONT
ACC AMP
BURST GATE
Y-AMP
DRIVE
AMP
VERT OSC
X-RAY
SYNC SEP
INVERTER

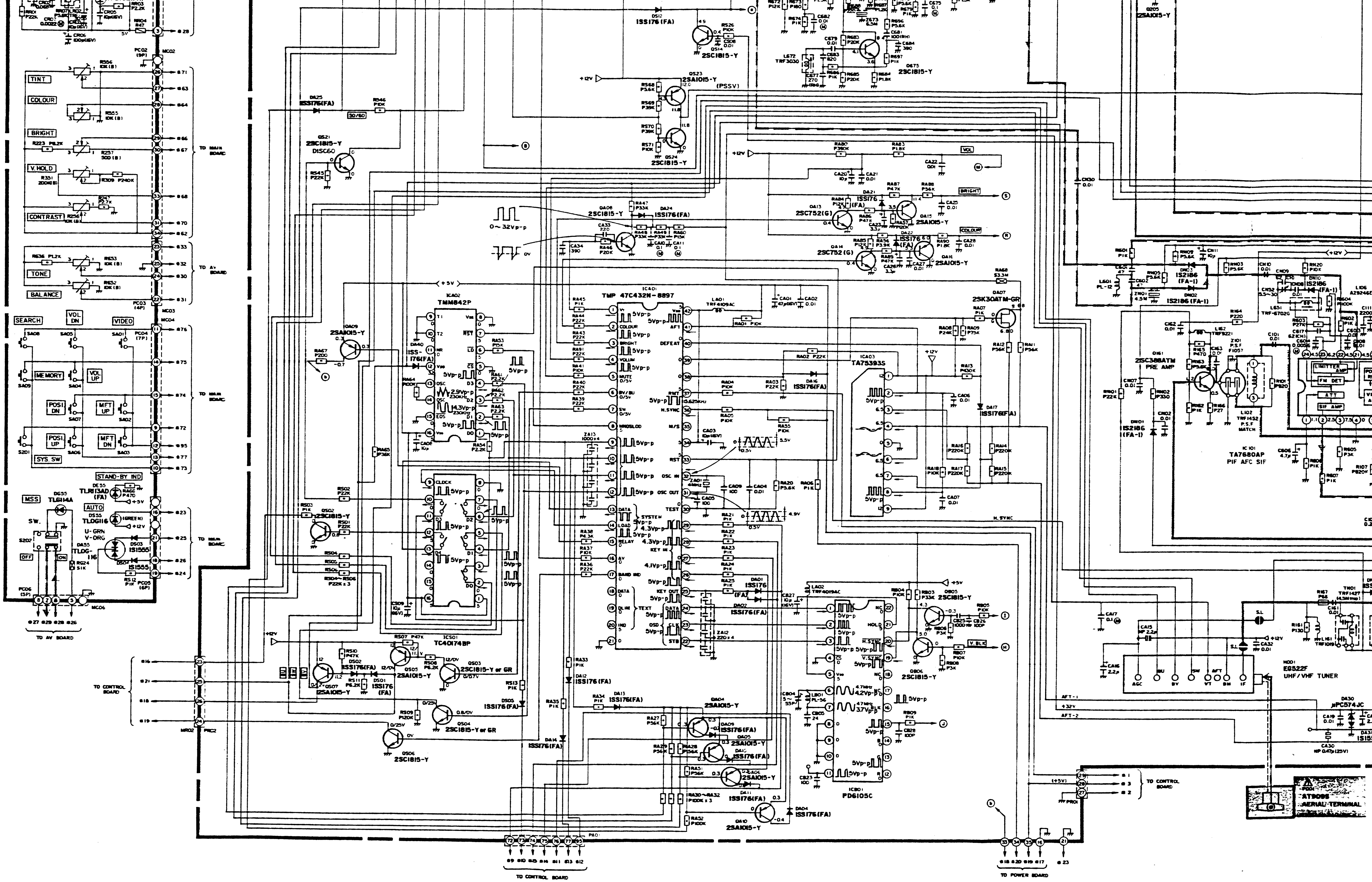
Mark
3
5
10
15
20
25

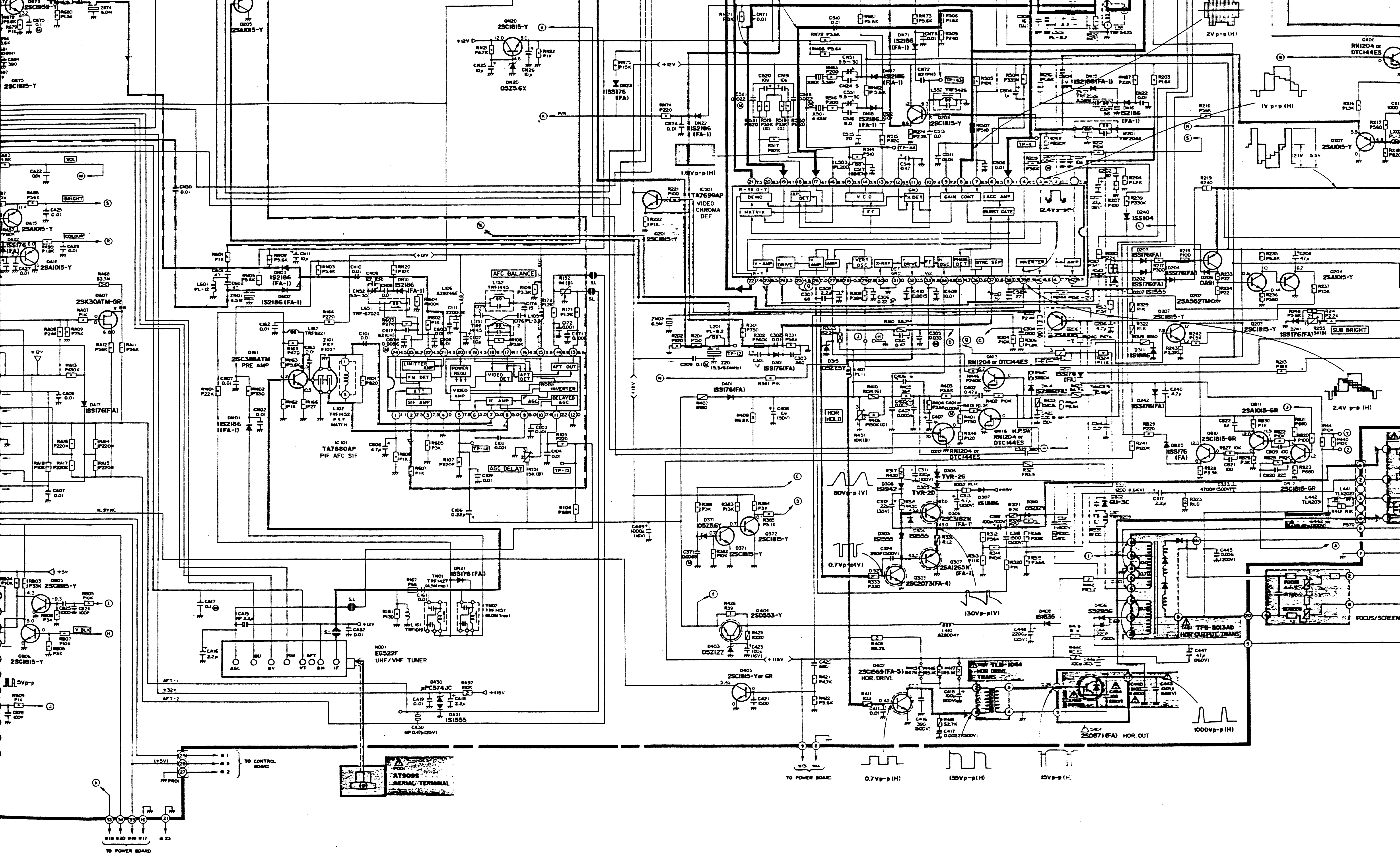
CAPACITOR

Table 3

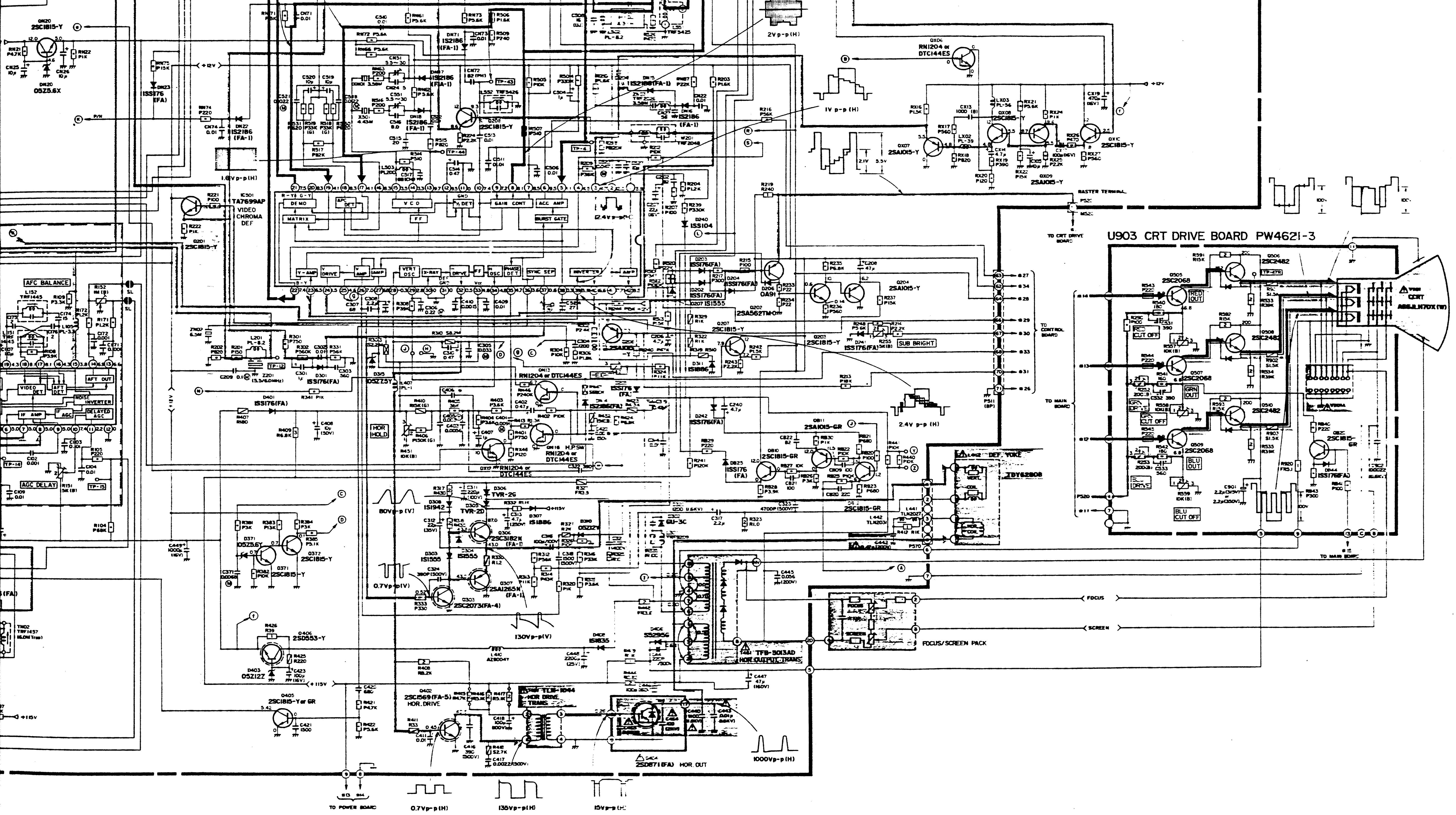
Type	Mark
Ceramic Disc 50V Only	⊣⊢
Electrolitic	⊣▯⊢ ⊣⊢
Electrolitic Non-Polar	⊣▯▯⊢ ⊣⊢⊢
Variable Capacitor	⊣⊢
Other	⊣⊢


PW4620
TO SECAM CHROMA BOARD
TO SECAM CHROMA BOARD
TO CRT-DRIVE BOARD
(R-Y OUT)
(G-Y OUT)
(B-Y OUT)
P510 (5P)
+2V
2SC1815-Y
2SC1815-GR
QN03
QN05
QN20
DN07 1S2186(FA-1)
DN06 1S2186 (FA-1)
LN03 PL-15
RN07 P1.5K
RN08 P330
RN12 P20K
RN23 P2.2K
RN19 P1.5K
RN18 P10K
RN21 P4.7K
RN22 P1K
CN25 10μ
CN26 10μ
DN20 05Z5.6X
DN23 1SS176 (FA)
RN75 P15K
+12V
P/N
RN74 P220
CN74 0.01
DN22 1S2186 (FA-1)
0.16V p-p(H)
0.5V p-p (H)
1.6V p-p(H)
2V p-p(H)
1V p-p (H)
0.7V p-p (H)
0.25V p-p (H)
2.5V p-p (H)
1.2V p-p (H)
2.1V p-p (H)
2.4V p-p(H)
2.1V
5.5V
100V
100V
R501 P820
CN20 7
RN69 P27K
DN19 1S2186 (FA-1)
C501 15
RN68 P27K
L501 PL-33
C502 10
RN71 P15K
CN71 0.01
C510 0.01
RN61 P5.6K
RN73 P5.6K
R506 P1.6K
R509 P240
DN71 1S2186 (FA-1)
CN73 0.01
RN72 P5.6K
RN66 P5.6K
CN51 5.5~30
RN63 P200
X501 3.58M
CN24 5
DN87 1S2186 (FA-1)
CN72 82 (PH)
TP-43
L552 TRF5426
C520 10μ
C519 10μ
C521 0.0022
C518 0.022
R531 P620
R519 P33K (G)
R518 P33K (G)
R520 P820
R517 P82K
X501 4.43M
R516 P200
C551 5.5~30
C516 8.0
DN18 1S2186 (FA-1)
RN62 P5.6K
C515 20
R515 P820
R224 P2.2K
C513 0.01
Q208 2SC1815-Y
R507 P540
R505 P10K
R504 P330K
C504 1μ
TP-44
R514 P510
L503 PL200
C517 68
C514 0.47
C511 0.01
C506 0.01
C508 16
L552 PL-8.2
L55 TRF5425
DN15 1S2186 (FA-1)
TRF2026 3.58M
RN87 P22K
R203 P1.6K
CN22 0.01
DN16 1S2186 (FA-1)
W201 TRF2048
TP-4
R222 P10K
R204 P12K
R239 P330K
R207 P100
D240 1SS104
IC501 TA7699AP VIDEO CHROMA DEF
R221 P100
R222 P1K
Q201 2SC1815-Y
R-Y B-Y G-Y
DEMO
APC DET
VCO
GND
½ DET
GAIN CONT
ACC AMP
MATRIX
FF
BURST GATE
Y-AMP
DRIVE
AMP
VERT OSC
X-RAY
DRIVE
FF
H OSC
PHASE DET
SYNC SEP
INVERTER
AMP
DEF GND
Vcc
AFC BALANCE
L152 TRF1445
R109 P3.3K
R152 1M (B)
SL
SL
C307 68
C308 2.2
R308 P39K
C306 0.22
C410 0.0015
C409 0.01
C524 27
D203 1SS176(FA)
R215 P100
R217 P300
D204 1SS176(FA)
D202 1SS176(FA)
D207 1S1555
D206 OA91
R233 P22
R234 P22
R235 P6.8K
C208 47μ
R236 P560
Q204 2SA1015-Y
R237 P15K
Q202
R216 P56K
R219 R240
QX06 RN1204 or DTC144ES
RX16 P1.5K
CX13 1000 (B)
LX03 PL-56
RX21 P5.6K
RX24 P1K
CX19 470μ 16V
QX08 2SC1815-Y
RX17 P560
LX02 PL-39
QX07 2SA1015-Y
RX18 P820
CX14 4.7μ
RX19 P390
RX20 P120
RX22 P15K
CX15 40μ
CX 100μ 16V
RX25 P2.2K
RX26 P470
RX27 P560
QX10 2SC1815-Y
QX09 2SA1015-Y
RASTER TERMINAL
P522
M522
TO CRT DRIVE BOARD
U903 CRT DRIVE BOARD PW4621-3
R591 R15K
Q506 2SC2482
TP-47R
Q505 2SC2068
R543 P220
R540 180
RED OUT
R533 R39K
V901 CRT A66JLH70X (W)


TINT
COLOUR
BRIGHT
V. HOLD
CONTRAST
TONE
BALANCE
SEARCH
VOL DN
VIDEO
MEMORY
VOL UP
POSI. DN
MFT UP
POSI. UP
MFT DN
SYS. SW
STAND-BY IND
MSS
AUTO
TL6114A
TLR113AD (FA)
TLOG116
U-GRN
V-ORG
TLOG-116
1S1555
TO MAIN BOARD
TO AV BOARD
TO AV BOARD
TO CONTROL BOARD
TO CONTROL BOARD
TO POWER BOARD
1SS176 (FA)
2SC1815-Y
2SA1015-Y
DISC60
0~32Vp-p
0V
TMM842P
ICA02
TC40174BP
ICS01
TMP 47C432N-8897
ICA01
TA75393S
ICA03
PD6105C
ICB01
2SK30ATM-GR
2SC752 (G)
2SC388ATM
PRE AMP
TA7680AP
PIF AFC SIF
IC101
1S2186 (FA-1)
EG522F
UHF/VHF TUNER
H001
AGC
BV
VT
BM
IF
µPC574JC
AT9099
AERIAL TERMINAL
P004
LIMITTER AMP
FM DET
ATT
SIF AMP
VOL
BRIGHT
COLOUR
V.BLK
H.SYNC
(PSSV)
+12V
+5V
+32V
AFT-1
AFT-2
30/60
VOLUM
MUTE
SW
MAIN/SLOD
RMT
H.SYNC
M/S
RST
OSC IN
OSC OUT
TEST
DATA
LOAD
RELAY
AV
BAND IND
SYSTEM
KEY IN
KEY OUT
DATA
CLK
STB
TEXT
OSD
D.LINE
IND
DEFEAT
AFT
CLOCK
HOLD
5Vp-p
4.3Vp-p
4.1Vp-p
4.2Vp-p
3.7Vp-p
15.625KHz
2.9Vp-p
4.3Vp-p
230KHz
TRF4019AC
TRF4109AC
TRF3030
TRF1452
P.S.F MATCH
TRF6702G
PL-12
PL-56
2SC1815-Y or GR



IC501 TA7699AP VIDEO CHROMA DEF
IC101 TA7680AP PIF AFC SIF
H001 EG522F UHF/VHF TUNER
AFC BALANCE
AGC DELAY
LIMITTER AMP
FM DET
ATT
SIF AMP
POWER REGU
VIDEO AMP
VIDEO DET
AFT DET
NOISE INVERTER
IF AMP
IF AGC
DELAYED AGC
AFT OUT
Q161 2SC388ATM PRE AMP
Z101 P.S.F F1057
L102 TRF1452 P.S.F MATCH
DEMO
MATRIX
APC DET
VCO
FF
GAIN CONT
ACC AMP
BURST GATE
Y-AMP
Y DRIVE
VERT OSC
X-RAY
PHASE DET
SYNC SEP
INVERTER
AMP
HOR HOLD
Q201 2SC1815-Y
Q207 2SC1815-Y
Q202 2SA562TM-O
Q204 2SA1015-Y
Q205 2SA1015-Y
Q805 2SC1815-Y
Q806 2SC1815-Y
Q810 2SC1815-GR
Q811 2SA1015-GR
Q812 2SC1815-GR
QX06 RN1204 or DTC144ES
QX07 2SA1015-Y
Q306 2SC1182N (FA-1)
Q307 2SA1265N (FA-1)
Q303 2SC2073(FA-4)
Q402 2SC1569(FA-5) HOR.DRIVE
Q404 2SD871(FA) HOR.OUT
Q405 2SC1815-Y or GR
Q406 2SD553-Y
Q371 2SC1815-Y
Q372 2SC1815-Y
QN20 2SC1815-Y
QN13 RN1204 or DTC144ES
QN16 H.P.SW RN1204 or DTC144ES
QX19 RN1204 or DTC144ES
QA07 2SK30ATM-GR
QA15 2SA1015-Y
QA16 2SA1015-Y
Q675 2SC1815-Y
Q673 2SC1959-Y
T401 TLF-1044 HOR DRIVE TRANS
T461 TFB-5013AD HOR.OUTPUT TRANS
P001 AT9095 AERIAL TERMINAL
TNO1 TRF1427 (4.5MHz trap)
TNO2 TRF1457 (6.0MHz trap)
L106 AZ9246E
L152 TRF1445
L651 TRF-6702G
L532 TRF3426
D430 μPC574JC
DA31 1S1555
VOL
BRIGHT
COLOUR
SUB BRIGHT
V.BLK
H. SYNC
AFT-1
+32V
AFT-2
(+5V)
+12V
+115V
+15V
FOCUS/SCREEN
TO CONTROL BOARD
TO POWER BOARD
80Vp-p (V)
0.7Vp-p(V)
130Vp-p(V)
0.7Vp-p (H)
135Vp-p (H)
15Vp-p (H)
1000Vp-p(H)
2Vp-p(H)
1V p-p (H)
2.4V p-p (H)
12.4V p-p (H)
1.8Vp-p(H)
5Vp-p
2.1V
5.5V


U903 CRT DRIVE BOARD PW4621-3
IC301 TA7699AP VIDEO CHROMA DEF
AFC BALANCE
AGC DELAY
VIDEO DET
AFT DET
AFT OUT
NOISE INVERTER
IF AMP
IF AGC
DELAYED AGC
DEMO
MATRIX
APC DET
VCO
GAIN CONT
ACC AMP
BURST GATE
Y-AMP
Y DRIVE
VERT OSC
X-RAY
DRIVE
H OSC
PHASE DET
SYNC SEP
INVERTER
SUB BRIGHT
HOR HOLD
RASTER TERMINAL
TO CRT DRIVE BOARD
TO CONTROL BOARD
TO MAIN BOARD
DEF. YOKE
TDY62808
T441 TFB-5013AD HOR OUTPUT TRANS
TLH-1044 HOR DRIVE TRANS
Q402 2SC1569(FA-5) HOR. DRIVE
Q404 2SD871(FA) HOR. OUT
Q405 2SC1815-Y or GR
Q406 2SD553-Y
Q303 2SC2073(FA-4)
Q307 2SA1265N(FA-1)
Q304 2SC3182K(FA-1)
Q505 2SC2068
Q506 2SC2482
Q507 2SC2068
Q508 2SC2482
Q509 2SC2068
Q510 2SC2482
RED OUT
GRN OUT
BLU OUT
RED CUT OFF
GRN CUT OFF
BLU CUT OFF
BL DRIVE
CCRT A66JLM70X(W)
FOCUS
SCREEN
FOCUS/SCREEN PACK
TO POWER BOARD
TO MAIN BOARD
1.6Vp-p(H)
2Vp-p(H)
1Vp-p(H)
2.4Vp-p(H)
80Vp-p(V)
0.7Vp-p(V)
130Vp-p(V)
1000Vp-p(H)
0.7Vp-p(H)
135Vp-p(H)
15Vp-p(H)
+12V
+115V

SCHEMATIC DIAGRAM < MODEL 289X4M >

NOTE: The parts identified by shading and ⚠ mark are critical for safety.
Replace only with part number specified.

OBSERVATION OF VOLTAGES AND WAVEFORMS

1. Voltages read with VTVM from point shown to chssis ground, line voltage 220 volts, colour bar signal.
2. Voltages reading may vary ±20%.
3. The schematic shown is representative only.
4. All waveforms are taken using a wide band oscilloscope and a low capacity probe.
5. Check FINE TUNING, AGC, BRIGHTNESS, CONTRAST and COLOUR controls for best picture, make sure that CONTRAST and COLOUR controls are in mid position and BRIGHTNESS control is almost in maximum position.
6. Waveforms are taken using a standard colour bar signal.
7. Voltage readings in (   ) are measured with the SECAM colour bar signal received.

NOTES:

1. D.C. resistnace value of a principal transformer is shown in this schematic diagram. These are measured for separated from the circuit.
2. The circuits are subject to change without notice.
3. ⊖ : Solder links.

EXPRESSION

VALUE OF RESISTOR, CAPACITOR and INDUCTOR

1. Resistance is shown in ohm, k=1,000, M=100,000.
2. Unless other wise noted in schematic, all capacitor values less than 1 are expressed in mfd and the values more than 1 in pF.
3. Unless otherwise noted in schematic, all inductor values more than 1 are expressed in μH, and the values less than 1 in H.

RESISTOR

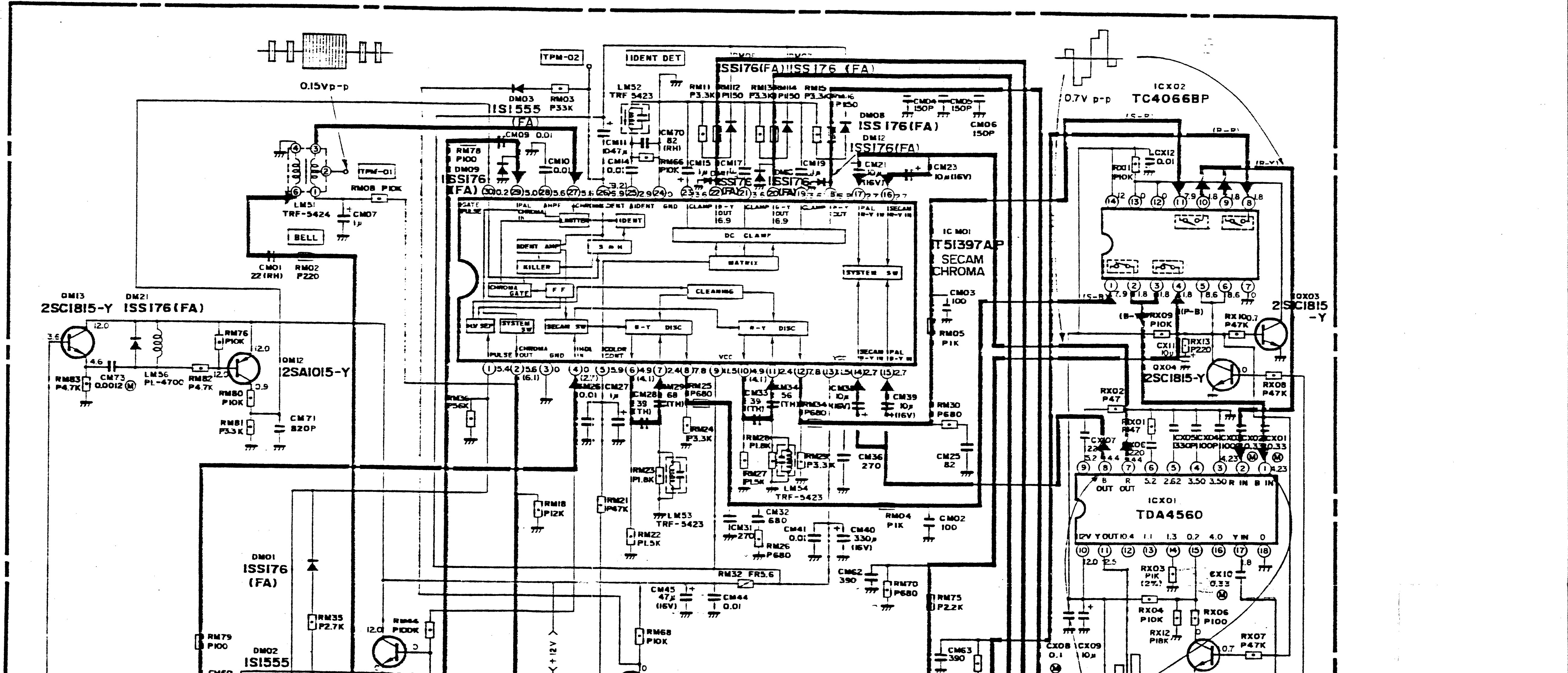
Table 1

Type	Mark
Carbon Composition	S
Oxide Metal Film	R
Insulated Carbon Film	P
Wire Wound	W
Cement	No Mark
Variable Resistor	-[/]-
Positive Thermistor	-[/]-
Negative Thermistor	-[⊠]-
Fusible Resistor	FR

Table

Watt	Mark	
1/16 W	-[• •]-	3
1/8 W 1/6 W	-[•]-	5
1/4 W	-[⊠]-	1
1/2 W	-[/]-	1
1 W	-[1]-	2
2 W	-[2]-	2

U501 SECAM CHROMA BOARD PW4628-1



0.15Vp-p
TPM-02
IDENT DET
DM03 ISS555 (FA)
RM03 P33K
LM52 TRF 5423
1SS176(FA) 1SS176 (FA)
LM51 TRF-5424
CM07 1μ
BELL
CM01 22(RH)
RM02 P220
RM08 P10K
DM09 1SS176 (FA)
DM08 1SS176(FA)
DM12 1SS176(FA)
IC M01 T51397AP SECAM CHROMA
IDENT
IDENT AMP
KILLER
CHROMA GATE
F.F
DC CLAMP
MATRIX
SYSTEM SW
CLEANING
R-Y DISC
B-Y DISC
CM03 100
RM05 P1K
RM30 P680
CM25 82
CM36 270
TRF-5423
LM53 TRF-5423
LM54
RM32 FR5.6
CM40 330μ (16V)
DM13 2SC1815-Y
DM21 1SS176(FA)
QM12 2SA1015-Y
LM56 PL-470C
CM73 0.0012
RM83 P4.7K
RM76 P10K
RM82 P4.7K
RM80 P10K
RM81 P3.3K
CM71 820P
DM01 1SS176 (FA)
DM02 1SS555
RM35 P2.7K
RM79 P100
0.7V p-p
ICX02 TC4066BP
QX03 2SC1815 -Y
QX04 2SC1815-Y
RX09 P10K
RX10 P47K
RX13 P220
RX02 P47
RX08 P47K
ICX01 TDA4560
RX03 P1K (2%)
RX04 P10K
RX06 P100
RX07 P47K
RX12 P18K
CX08 0.1
CX09 10μ
CX10 0.33

f a principal transformer is shown in this schematic dia-
red for separated from the circuit.
to change without notice.

CAPACITOR and INDUCTOR

ohm, k=1,000, M=100,000.
d in schematic, all capacitor values less than 1 are expres-
es more than 1 in pF.
in schematic, all inductor values more than 1 are expres-
es less than 1 in H.

RESISTOR

Table 1

Type	Mark
Carbon Composition	S
Oxide Metal Film	R
Insulated Carbon Film	P
Wire Wound	W
Cement	No Mark
Variable Resistor	-[/]-
Positive Thermistor	-[/]-
Negative Thermistor	-[⊠]-
Fusible Resistor	FR

Table 2

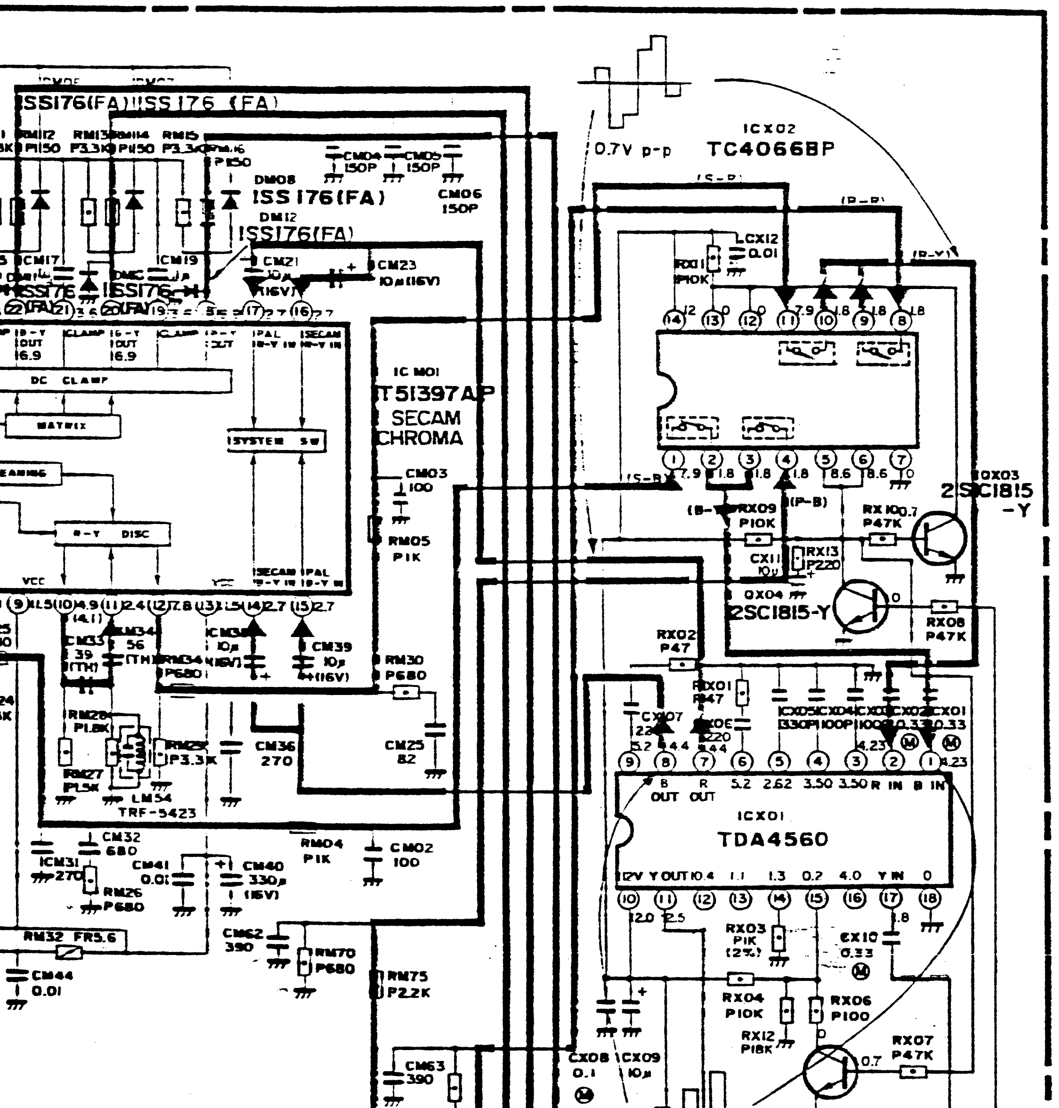
Watt	Mark	Watt	Mark
1/16 W	-[••]-	3 W	-[3]-
1/8 W 1/6 W	-[•]-	5 W	-[5]-
1/4 W	-[⊠]-	10 W	-[10]-
1/2 W	-[/]-	15 W	-[15]-
1 W	-[1]-	20 W	-[20]-
2 W	-[2]-	25 W	-[25]-

CAPACITOR

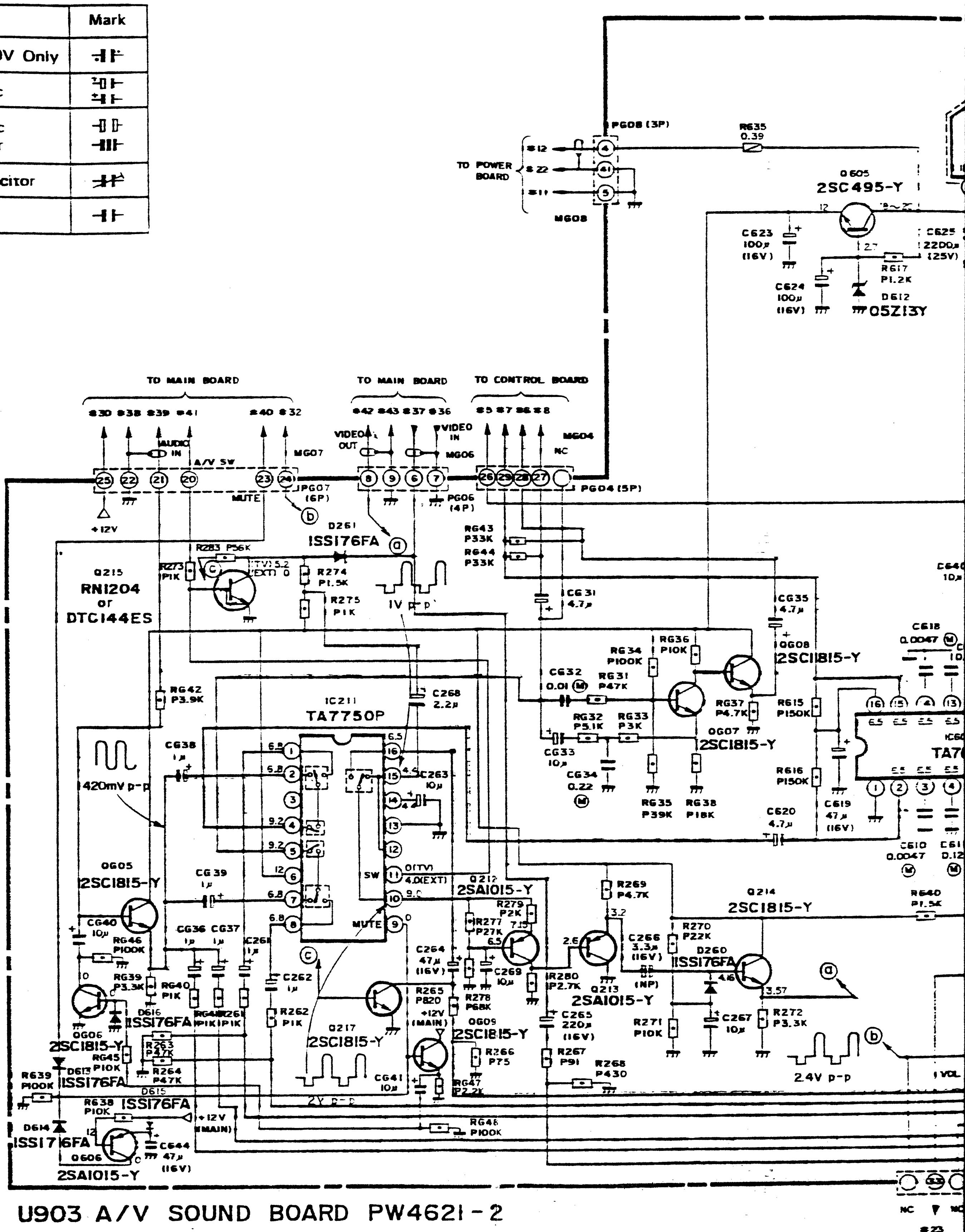
Table 3

Type	Mark
Ceramic Disc 50V Only	⊣⊢
Electrolitic	⊣⊢ ⊣⊢
Electrolitic Non-Polar	⊣⊢ ⊣⊢
Variable Capacitor	⊣⊢
Other	⊣⊢

D PW4628-1



ISS176(FA)
ISS176 (FA)
DM08
ISS176(FA)
DM12
ISS176(FA)
CM06 150P
CM23 10μ(16V)
IC M01
T5I397AP
SECAM
CHROMA
DC CLAMP
MATRIX
SYSTEM SW
R-Y DISC
CM03 100
RM05 P1K
RM30 P680
CM25 82
CM36 270
TRF-5423
RM04 P1K
CM02 100
CM40 330μ (16V)
RM32 FR5.6
CM44 0.01
RM75 P2.2K
CM63 390
0.7V p-p
ICX02
TC4066BP
LCX12 0.01
RX01 P10K
QX03
2SC1815-Y
QX04
2SC1815-Y
RX09 P10K
RX10 P47K
RX13 P220
RX08 P47K
RX02 P47
ICX01
TDA4560
B OUT
R OUT
12V
Y OUT
Y IN
R IN
B IN
RX03 P1K (2%)
CX10 0.33
RX04 P10K
RX06 P100
RX12 P18K
RX07 P47K
CX08 0.1
CX09 10μ



PG08 (3P)
R635 0.39
TO POWER BOARD
#12
#22
#11
MG08
Q605
2SC495-Y
C623 100μ (16V)
C624 100μ (16V)
C625 2200μ (25V)
R617 P1.2K
D612
05Z13Y
TO MAIN BOARD
#30 #38 #39 #41
#40 #32
TO MAIN BOARD
#42 #43 #37 #36
TO CONTROL BOARD
#5 #7 #6 #8
VIDEO OUT
VIDEO IN
AUDIO IN
A/V SW
MUTE
MG07
MG06
MG04
PG07 (6P)
PG06 (4P)
PG04 (5P)
+12V
D261
ISS176FA
Q215
RN1204
or
DTC144ES
R283 P56K
R273 P1K
R274 P1.5K
R275 P1K
R643 P33K
R644 P33K
CG31 4.7μ
CG35 4.7μ
QG08
2SC1815-Y
RG34 P100K
RG36 P10K
RG31 P47K
CG32 0.01
RG37 P4.7K
QG07
2SC1815-Y
RG32 P5.1K
RG33 P3K
CG33 10μ
CG34 0.22
RG35 P39K
RG38 P18K
RG42 P3.9K
IC211
TA7750P
C268 2.2μ
C263 10μ
CG38 1μ
420mV p-p
QG05
2SC1815-Y
CG39 1μ
CG40 10μ
RG46 P100K
CG36 1μ
CG37 1μ
C261
C262 1μ
R262 P1K
Q217
2SC1815-Y
Q212
2SA1015-Y
R279 P2K
R277 P27K
C264 47μ (16V)
C269 10μ
R265 P820
R278 P68K
QG09
2SC1815-Y
R266 P75
RG47 P2.2K
R269 P4.7K
Q213
2SA1015-Y
R280 P2.7K
C265 220μ (16V)
R267 P91
R268 P430
C266 3.3μ (16V)
R270 P22K
D260
ISS176FA
Q214
2SC1815-Y
R271 P10K
C267 10μ
R272 P3.3K
2.4V p-p
RG39 P3.3K
RG40 P1K
D616
ISS176FA
RG44 P1K
RG41 P1K
R263 P47K
R264 P47K
QG06
2SC1815-Y
RG45 P10K
D613
ISS176FA
R639 P100K
R638 P10K
D615
ISS176FA
D614
ISS176FA
Q606
2SA1015-Y
C644 47μ (16V)
C641 10μ
RG48 P100K
2V p-p
1V p-p
+12V (MAIN)
R615 P150K
R616 P150K
C618 0.0047
C619 47μ (16V)
C620 4.7μ
C610 0.0047
R640 P1.5K
TA7

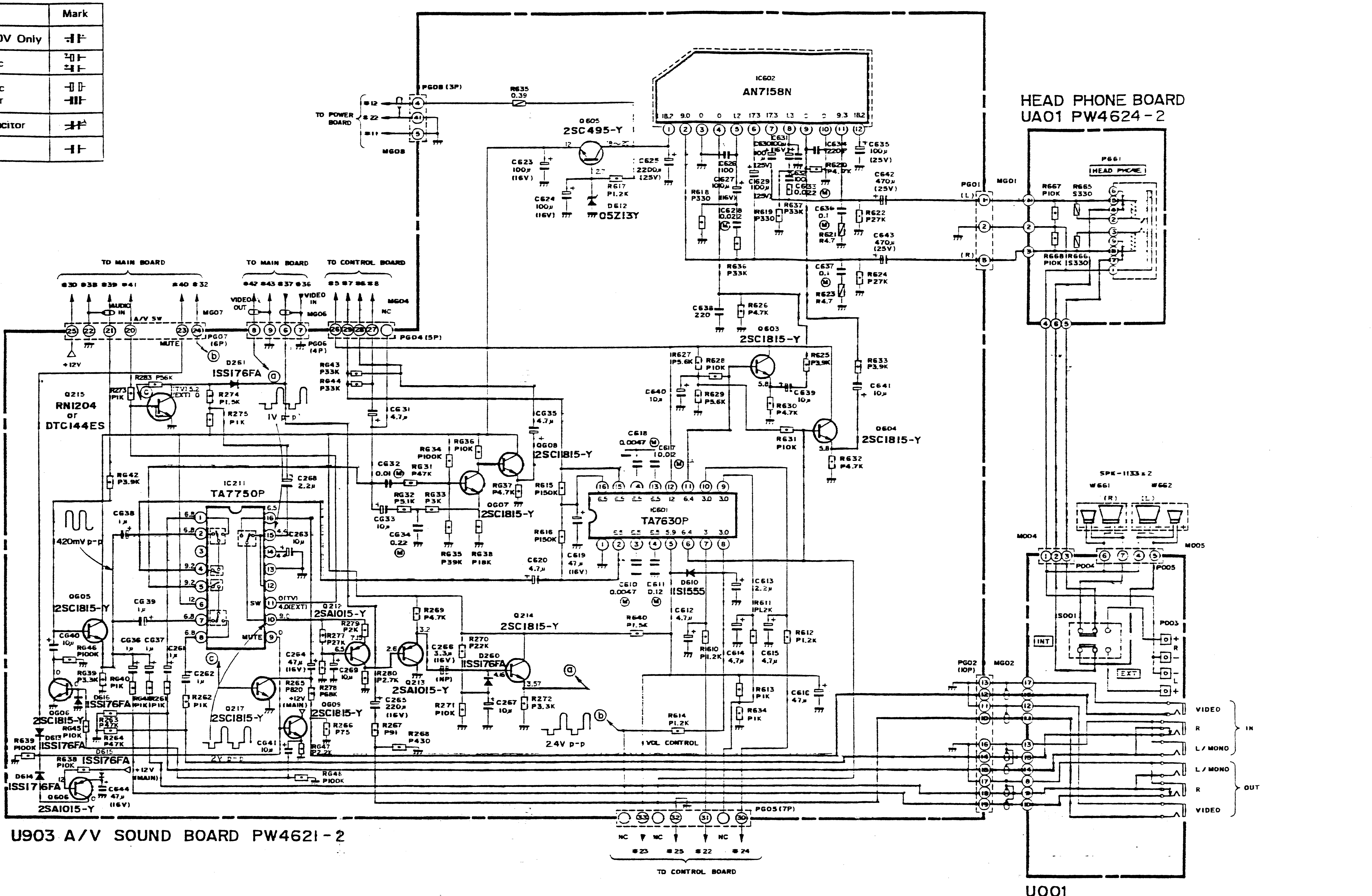
U903 A/V SOUND BOARD PW4621-2

Watt	Mark
W	3
W	5
W	10
W	15
W	20
W	25

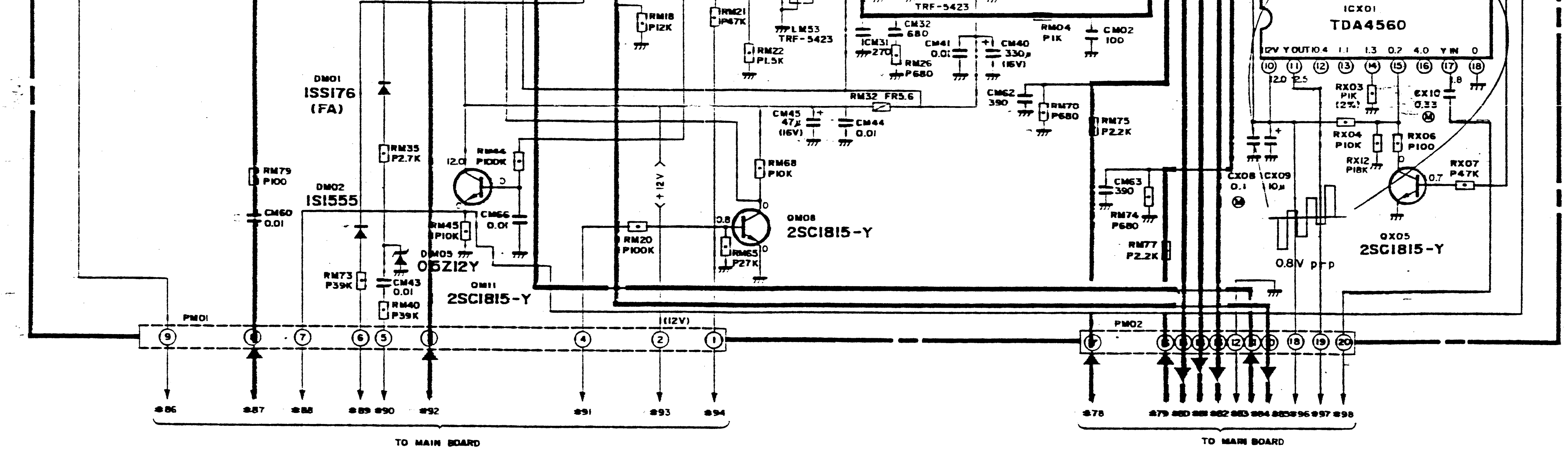
CAPACITOR

Table 3

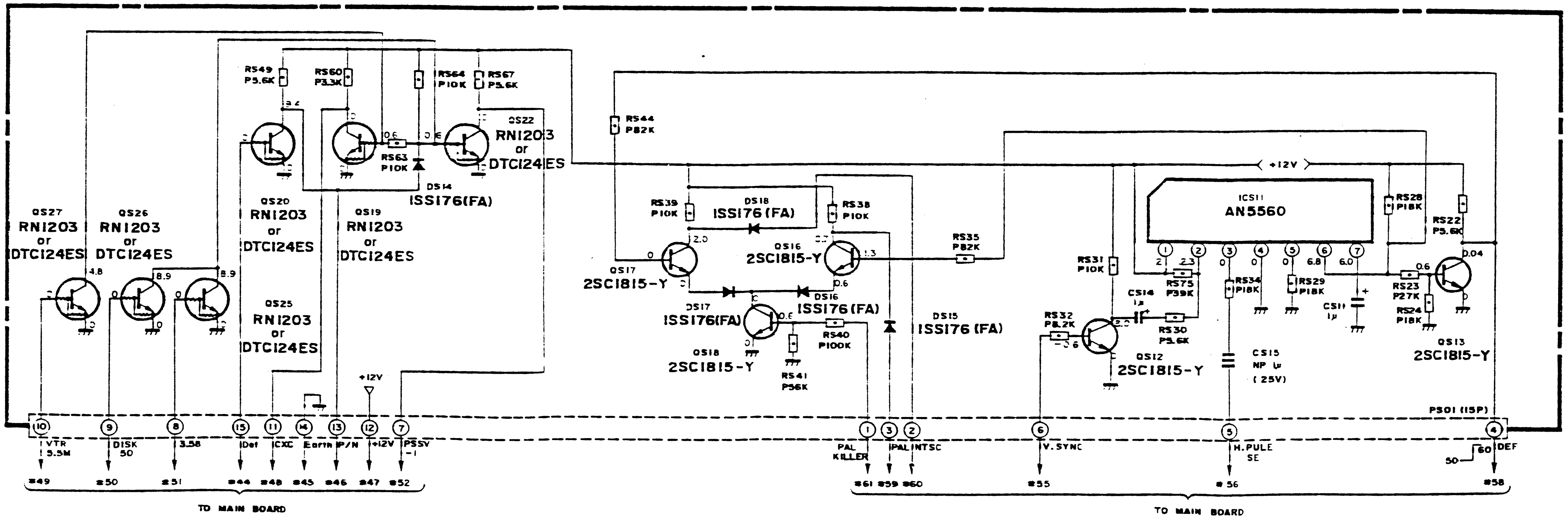
Type	Mark
Ceramic Disc 50V Only	⊣⊢
Electrolitic	⁺⊣⊢
Electrolitic Non-Polar	⊣⊢
Variable Capacitor	⊣⊢
Other	⊣⊢

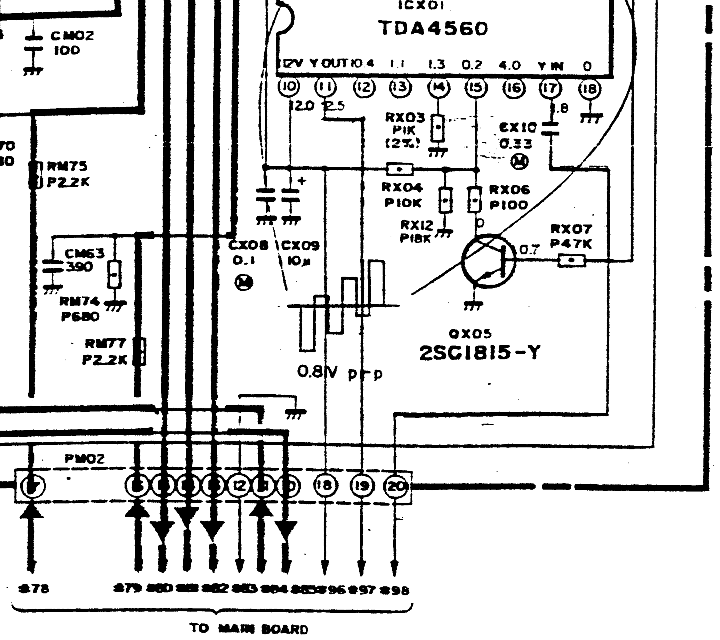


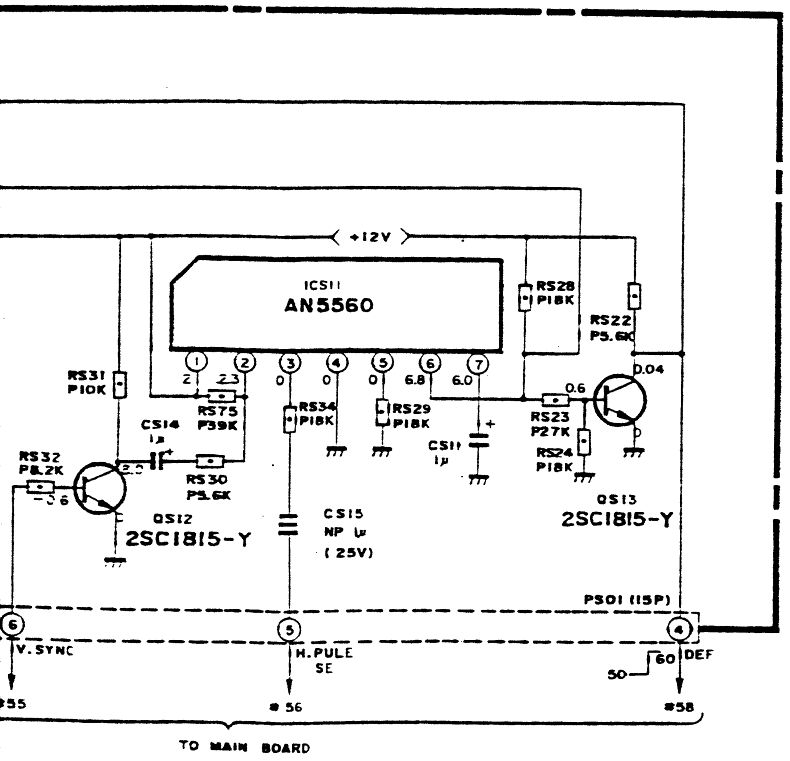
HEAD PHONE BOARD
UA01 PW4624-2
IC602
AN7158N
IC211
TA7750P
IC601
TA7630P
Q605 2SC495-Y
Q603 2SC1815-Y
Q604 2SC1815-Y
Q608 2SC1815-Y
Q607 2SC1815-Y
Q215 RN1204 or DTC144ES
0G05 2SC1815-Y
0G06 2SC1815-Y
Q606 2SA1015-Y
Q212 2SA1015-Y
Q213 2SA1015-Y
Q214 2SC1815-Y
Q217 2SC1815-Y
0G09 2SC1815-Y
D261 1SS176FA
D260 1SS176FA
D610 1SS155
D612 05Z13Y
D614 1SS176FA
D615 1SS176FA
D616 1SS176FA
D613 1SS176FA
TO POWER BOARD
TO MAIN BOARD
TO CONTROL BOARD
PG08 (3P)
MG08
PG07 (6P)
MG07
PG06 (4P)
MG06
PG04 (5P)
MG04
PG01
MG01
PG02 (10P)
MG02
PG05 (7P)
AUDIO IN
A/V SW
MUTE
VIDEO OUT
VIDEO IN
NC
+12V
+12V (MAIN)
420mV p-p
1V p-p
2V p-p
2.4V p-p
VOL CONTROL
P661 HEAD PHONE
SPK-1133 x 2
W661 (R)
W662 (L)
M004
M005
P004
P005
S001
INT
EXT
P003
VIDEO
R
L/MONO
IN
OUT
U903 A/V SOUND BOARD PW4621-2
U001

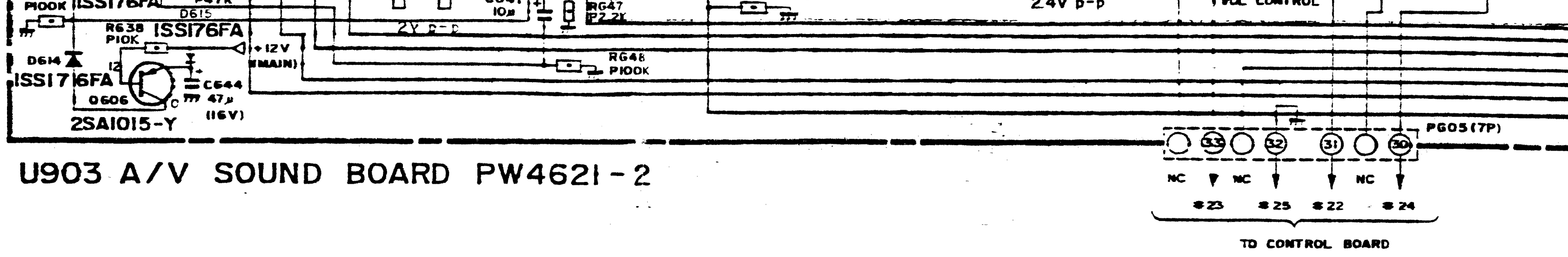

ICX01
TDA4560
DM01
1SS176
(FA)
DM02
1S1555
DM05
05Z12Y
QM11
2SC1815-Y
QM08
2SC1815-Y
QX05
2SC1815-Y
RM79 P100
CM60 0.01
RM35 P2.7K
RM64 P100K
CM66 0.01
RM45 P10K
RM73 P39K
CM43 0.01
RM40 P39K
RM20 P100K
RM65 P27K
RM68 P10K
RM18 P12K
RM21 P47K
RM22 P1.5K
LM53 TRF-5423
TRF-5423
CM31 270
CM32 680
RM26 P680
CM41 0.01
CM40 330μ (16V)
RM04 P1K
CM02 100
RM32 FR5.6
CM45 47μ (16V)
CM44 0.01
CM62 390
RM70 P680
RM75 P2.2K
CM63 390
RM74 P680
RM77 P2.2K
CX08 0.1
CX09 10μ
RX03 P1K (2%)
EX10 0.33
RX04 P10K
RX06 P100
RX12 P18K
RX07 P47K
0.8V p-p
+12V
(12V)
PM01
PM02
#86
#87
#88
#89
#90
#92
#91
#93
#94
#78
#79
#80
#81
#82
#83
#84
#85
#96
#97
#98
TO MAIN BOARD
TO MAIN BOARD

U501 SYSTEM SW. BOARD PW4628-2

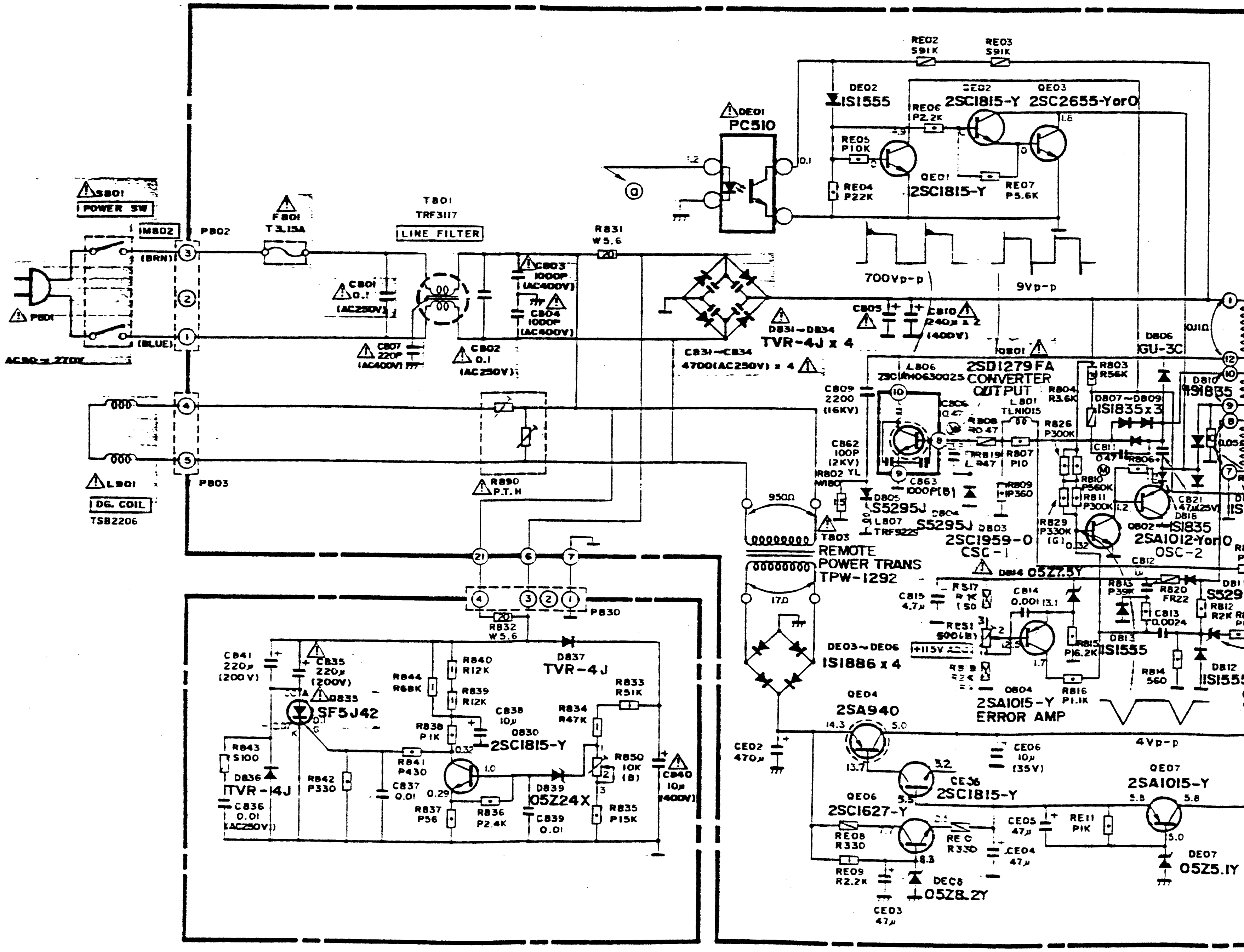

QS27
RN1203
or
DTC124ES
QS26
RN1203
or
DTC124ES
QS20
RN1203
or
DTC124ES
QS25
RN1203
or
DTC124ES
QS19
RN1203
or
DTC124ES
QS22
RN1203
or
DTC124ES
RS49 P5.6K
RS60 P3.3K
RS64 P10K
RS67 P5.6K
RS63 P10K
DS14
1SS176(FA)
RS44 P82K
RS39 P10K
DS18
1SS176 (FA)
RS38 P10K
QS17
2SC1815-Y
QS16
2SC1815-Y
DS17
1SS176(FA)
DS16
1SS176(FA)
QS18
2SC1815-Y
RS40 P100K
RS41 P56K
DS15
1SS176 (FA)
RS35 P82K
+12V
ICS11
AN5560
RS28 P18K
RS22 P5.6K
RS31 P10K
RS75 P39K
CS14 1μ
RS30 P5.6K
RS34 P18K
RS29 P18K
CS11 1μ
RS23 P27K
RS24 P18K
RS32 P8.2K
QS12
2SC1815-Y
CS15 NP 1μ (25V)
QS13
2SC1815-Y
PS01 (15P)
VTR 5.5M
DISK 50
3.58
IDet
CXC
Earth
P/N
+12V
PSSV -1
PAL KILLER
PAL
NTSC
V.SYNC
H.PULSE
DEF
#49
#50
#51
#44
#48
#45
#46
#47
#52
#61
#59
#60
#55
#56
#58
TO MAIN BOARD
TO MAIN BOARD


ICX01
TDA4560
QX05
2SC1815-Y
0.8V p-p
PM02
TO MAIN BOARD


ICS11
AN5560
+12V
QS12
2SC1815-Y
QS13
2SC1815-Y
PS01 (15P)
V. SYNC
H. PULSE
DEF
TO MAIN BOARD

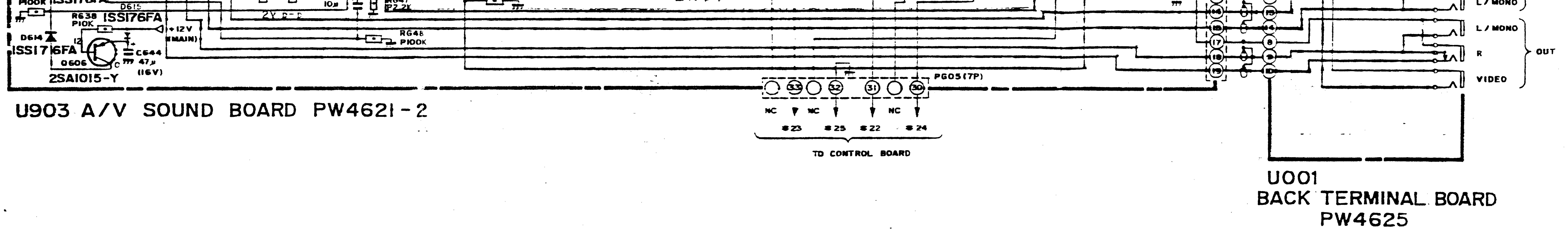

ISS176FA
2SA1015-Y
PG05 (7P)
TO CONTROL BOARD

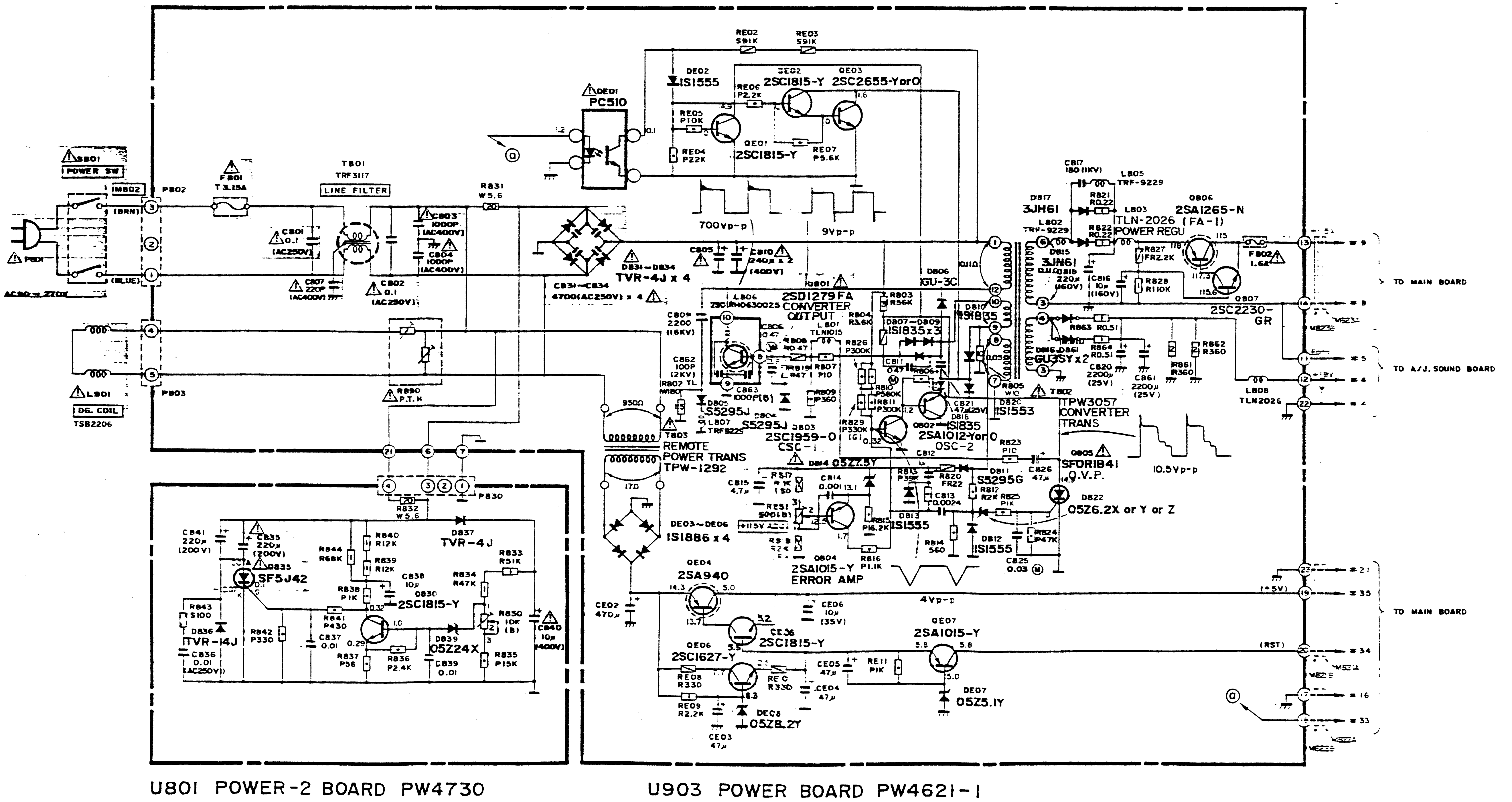
U903 A/V SOUND BOARD PW4621-2


POWER SW
LINE FILTER
T801
TRF3117
F801
T3.15A
PC510
2SC1815-Y
2SC2655-Y or O
700Vp-p
9Vp-p
TVR-4J x 4
2SD1279FA
CONVERTER OUTPUT
2SA1012-Y or O
OSC-2
REMOTE POWER TRANS
TPW-1292
2SA1015-Y
ERROR AMP
2SA940
2SC1627-Y
2SC1815-Y
05Z5.1Y
05Z8.2Y
4Vp-p
DG. COIL
P.T.H
SF5J42
2SC1815-Y
05Z24X
TVR-4J
AC90-270V

U801 POWER-2 BOARD PW4730

U903 POWER BOARD PW4621-1


U903 A/V SOUND BOARD PW4621-2
U001
BACK TERMINAL BOARD
PW4625
R638 P10K
ISS176FA
D614
ISS176FA
Q606
2SA1015-Y
C644 47µ (16V)
+12V (MAIN)
R648 P100K
PG05(7P)
NC
#23
#25
#22
#24
TO CONTROL BOARD
L/MONO
R
VIDEO
OUT


U801 POWER-2 BOARD PW4730
U903 POWER BOARD PW4621-1
SB01
POWER SW
P801
AC90~270V
IM802
P802
(BRN)
(BLUE)
F801 T3.15A
T801 TRF3117
LINE FILTER
C801 0.1 (AC250V)
C807 220P (AC400V)
C802 0.1 (AC250V)
C803 1000P (AC400V)
C804 1000P (AC400V)
R831 W5.6
D831~D834 TVR-4J x 4
C831~C834 4700(AC250V) x 4
C805
C810 240µ x 2 (400V)
DE01 PC510
DE02 1S1555
RE02 S91K
RE03 S91K
QE02 2SC1815-Y
QE03 2SC2655-YorO
RE06 P2.2K
RE05 P10K
RE04 P22K
QE01 2SC1815-Y
RE07 P5.6K
700Vp-p
9Vp-p
L901
DG. COIL
TSB2206
P803
R890 P.T.H
T803 REMOTE POWER TRANS TPW-1292
950Ω
17Ω
DE03~DE06 1S1886 x 4
CE02 470µ
Q801 2SD1279FA CONVERTER OUTPUT
L806 TLN40630025
C809 2200 (16KV)
C862 100P (2KV)
R802 M180
D805 S5295J
L807 TRF9229
D804 S5295J
D803
Q803 2SC1959-O CSC-1
D814 05Z7.5Y
L801 TLN1015
R808 R0.47
R819 R0.47
R807 P10
R809 P360
R803 R56K
R804 R3.6K
R826 P300K
R810 P560K
R811 P300K
R829 P330K
D806 GU-3C
D807~D809 1S1835x3
D810 1S1835
C811 0.047
C821 47µ(25V)
Q802 2SA1012-YorO OSC-2
D818 1S1835
D820 1S1553
R805 W10
T802
TPW3057 CONVERTER TRANS
10.5Vp-p
R823 P10
C812
R817
C815 4.7µ
RE31
C814 0.001
R813 P39K
R820 FR22
C813 0.0024
D811 S5295G
R812 R2K
R825 P1K
Q805 SF0R1B41 O.V.P.
C826 47µ
D822 05Z6.2X or Y or Z
R824 P47K
D813 1S1555
D812 1S1555
R814 560
R815 P16.2K
R816 P1.1K
Q804 2SA1015-Y ERROR AMP
C825 0.03
4Vp-p
C817 180 (1KV)
L805 TRF-9229
D817 3JH61
L802 TRF-9229
R821 R0.22
R822 R0.22
L803 TLN-2026
Q806 2SA1265-N (FA-1)
POWER REGU
D815 3JN61
C819 220µ (160V)
C816 10µ (160V)
R827 FR2.2K
R828 R110K
Q807 2SC2230-GR
F802 1.6A
R863 R0.51
R864 R0.51
D816,D861 GU3SY x2
C820 2200µ (25V)
C861 2200µ (25V)
R862 R360
R861 R360
L808 TLN2026
TO MAIN BOARD
TO A/J. SOUND BOARD
# 9
# 8
# 5
# 4
# 2
# 21
# 35
# 34
# 16
# 33
(+5V)
(RST)
QE04 2SA940
CE06 10µ (35V)
CE36 2SC1815-Y
QE07 2SA1015-Y
QE06 2SC1627-Y
RE08 R330
RE09 R2.2K
RE10 R330
CE03 47µ
DE08 05Z8.2Y
CE05 47µ
CE04 47µ
RE11 P1K
DE07 05Z5.1Y
P830
R832 W5.6
D837 TVR-4J
C841 220µ (200V)
C835 220µ (200V)
D835 SF5J42
R843 S100
D836 TVR-4J
C836 0.01 (AC250V)
R840 R12K
R839 R12K
R844 R68K
R838 P1K
R841 P430
C838 10µ
Q830 2SC1815-Y
R842 P330
C837 0.01
R837 P56
R836 P2.4K
D839 05Z24X
C839 0.01
R834 R47K
R833 R51K
R850 10K (B)
R835 P15K
C840 10µ (400V)

This manual is the latest at the time of printing, and does not include the modifications which may be made after the printing, by the constant improvement of product.

TOSHIBA CORPORATION

1-1, SHIBAURA 1-CHOME, MINATO-KU, TOKYO 105, JAPAN